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October 2013



THE IMPACT OF
FAMILY INVOLVEMENT ON THE
EDUCATION OF CHILDREN
AGES 3 TO 8

**A Focus on Literacy and
Math Achievement Outcomes and
Social-Emotional Skills**

The Impact of Family Involvement on the Education of Children Ages 3 to 8

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Overview

This report summarizes research conducted primarily over the past 10 years on how families' involvement in children's learning and development through activities at home and at school affects the literacy, mathematics, and social-emotional skills of children ages 3 to 8. A total of 95 studies of family involvement are reviewed. These include both descriptive, nonintervention studies of the actions families take at home and at school and intervention studies of practices that guide families to conduct activities that strengthen young children's literacy and math learning. The family involvement research studies are divided into four categories:

- **Learning activities at home**, including those that parents engage in to promote their child's literacy and/or math skills outside school
- **Family involvement at school**, including the actions and interactions that families have while in the school building
- **School outreach to engage families**, including the strategies that schools and teachers use to engage families and make them feel welcome
- **Supportive parenting activities**, including the nature and quality of the parent-child relationship and home environment, rule-setting, and caring behaviors

Key Findings

- **Family involvement is important for young children's literacy and math skills.** The majority of studies, including some randomized control trials (RCTs), demonstrate this positive link. A few studies show positive relations with social-emotional skills. The weakest association was between family involvement at school and children's outcomes.
- **Parents from diverse backgrounds, when given direction, can become more engaged with their children. And when parents are more engaged, children tend to do better.**
- **This review also provides recommendations for additional lines of inquiry and implications to guide next steps in both research and practice.** While there is still more to learn about how to connect with and support caretakers' efforts to promote children's learning, what we already know from extant research can help guide this process.

More children attend preschool and all-day kindergarten than ever before, and educators are being urged by federal, state, and local institutions to use research-based or evidence-based approaches to improve their work with families and families' involvement with their children and the school. This review strengthens the belief that interventions to boost family involvement may be a critical piece when trying to support children's early learning.

Contents

Overview	iii
List of Exhibits	vii
Preface	ix
Acknowledgments	xi
Executive Summary	ES-1
Chapter	
1	Introduction 1
2	Family Involvement in Reading and Literacy Activities and Results for Children’s Literacy Achievement and Social-Emotional Skills 7
3	Family Involvement in Math Activities and Results for Children’s Math Achievement and Social-Emotional Skills 51
4	Summary, Reflections, and Recommendations 75
Appendix	
A	Studies of Family Involvement in Literacy Activities and Math Activities and Social-Emotional Outcomes 87
B	Examples from the Field: Family Involvement Activities with Young Children 163
C	Glossary 181
References	
	General References 187
	References for Chapter 2: Reading and Literacy Activities 191
	References for Chapter 3: Math Activities 198

List of Exhibits

Table

1.1	Description of Journal Articles for Literacy and Math Reviews	6
A.1	Studies of Family Involvement in Literacy Activities and Literacy and Social-Emotional Outcomes	89
A.2	Studies of Family Involvement in Math Activities and Math and Social-Emotional Outcomes	127
B.1	Examples from the Field from Preschool to Elementary School: Family Involvement Activities of Reading with Young Children	169
B.2	Examples from the Field from Preschool to Elementary School: Family Involvement Activities of Math with Young Children	173
B.3	Examples from the Field from Preschool: Transition Activities with Young Children and Families	177

Box

2.1	Feature Study: Family Involvement in Reading Activities at Home	13
2.2	Feature Study: Effects of Parent Intervention on Play and Learning Strategies (PALS) on Achievement and Social-Emotional Skills	16
2.3	Feature Studies: Parent-Child Conversations at Home	18
2.4	Feature Study: Multiple Measures of Family Involvement in Learning Activities at Home Versus Other Types of Family Involvement	21
2.5	Feature Study: Effects of Family Involvement at Home on Learning and Behavior	22
2.6	Feature Study: Effects of Family Involvement at School Over Time	28
2.7	Feature Study: Composite Measure of Parental Involvement and Children's Achievement and Social-Emotional Skills	39
2.8	Feature Study: Intervention on Supportive Parenting and Achievement Outcomes	43
2.9	Feature Study: Change in Supportive Parenting and Results for Children's Achievement and Social-Economical Skills	45
3.1	Feature Study: Intervention to Increase Parent Involvement in Math Activities at Home	55
3.2	Feature Study: Intervention to Increase Parent Involvement in General Learning Activities at Home	58

Box

3.3	Feature Study: Nonintervention Exploration of Composite Measures of Parental Involvement and Children's Learning and Behavior	60
4.1	Reading and Literary-Related Activities Engaged in by Children and Families	84
4.2	Math-Related Activities Engaged in by Children and Families	85

Preface

In recent years, large investments have been made in the early childhood field with the goal of positively affecting young children’s outcomes through two areas of inquiry: (1) parenting and home visiting and (2) early childhood care and education. This commitment is underscored by President Obama’s Early Learning Initiative, with its focus on a continuum of high-quality early learning for every child in America from birth to age 5 and its aim of “leveling the playing field” for children from lower-income families. The family involvement research that is summarized in this report is firmly situated at the nexus of these two important areas of work, connecting what happens in the home with what happens in the school — while keeping the child and positive child development as the primary focus. Given this context and the increased expectation that education systems use research-based or evidence-based approaches in their work with families, the connection between home and school — and how best to support it — is likely a critical piece of the puzzle of how to comprehensively promote children’s early learning.

This report on almost 100 family involvement research studies focusing on the literacy, math, and socio-emotional skills of children ages 3 to 8 is a timely contribution to the field. It presents the most rigorous empirical work that has been conducted, primarily over the past 10 years. The review finds that parents from diverse backgrounds, when given direction, can increase their involvement with their children’s learning at home and at school and that, when parents are more involved and more engaged, children tend to do better academically and socially. More importantly, this review makes explicit recommendations for further lines of inquiry and offers several implications to guide next steps in both research and practice. While there is still much more to learn about how to connect with and support families’ efforts to promote children’s learning across the home and school contexts most effectively, this report is a much-needed first step.

Gordon L. Berlin
President

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We want to thank the authors of, and the families and children who participated in, the numerous studies that we drew on for this report. We also acknowledge a number of colleagues from MDRC who were involved in this literature review. Virginia Knox, Families and Children Policy Area Director and Senior Adviser for this work, provided valuable feedback on initial drafts of this report. Jennifer Garcia and Jennifer Somers assisted in the initial literature review and in producing detailed appendix tables.

We extend much thanks to M. Elena Lopez, Associate Director at Harvard Family Research Project, for her incredibly detailed and thorough review of this report. Her thoughts and guidance pushed our thinking in multiple ways, leading to additional emphasis on how the findings can be applied to practitioners and the field at large. We also thank Laurie Miller Brotman, Prevention Science Professor of Child and Adolescent Psychiatry and Psychiatry and the Director of the Institute for Prevention Science at the Child Study Center at New York University, for lending her expertise and providing two rounds of thoughtful comments and review.

Robert Weber edited the report, and Stephanie Cowell prepared it for publication.

The Authors

Executive Summary

Children benefit when parents and family members get involved in their learning and development. This conclusion is supported by decades of research that suggests that family engagement is positively linked to children's outcomes in preschool, kindergarten, and early elementary grades.

Yet it has been unclear *how* families affect their children's learning at home and in school and how the establishment of a partnership between families and schools can lead to positive outcomes for children. We still do not know what *aspects* of family involvement are important for children's learning. For example, is it better for parents to conduct early learning activities at home or at school? And what *types* of early learning activities can parents do with their children that are critical to learning and development? And in what *ways* can schools and teachers guide and encourage parents to do these things with their children?

To help answer these questions, this report summarizes the research conducted over the past 10 years on the effects of family involvement activities at home and at school on literacy, mathematics, and social-emotional skills for children ages 3 to 8. In addition, it provides new information on the impact of family involvement on these skills specifically for preschool children, and it pays special attention to the practices necessary to help prepare parents and children for the transition from preschool to kindergarten. Finally, this report identifies the gaps in knowledge that future research should address, and it discusses how to use research findings to inform and improve practice.

Several terms in this report are used interchangeably both in the field and in research. For instance, "involvement" and "engagement" are both used but convey the same meaning. And while we recognize that many individuals in a family may play important roles in a child's learning at home and at school, most studies examine parents or caregivers; therefore, we use the words "family" and "parent" interchangeably. Finally, in this report, "children" and "students" are used synonymously.

Overview of the Research

The studies reviewed in this report represent the most rigorous work conducted over the past decade on the nature and effects of family involvement on young children's literacy, math, and social-emotional skills. A total of 95 studies of family involvement practices as they affect young children's literacy and math learning and social-emotional skills are reviewed: 52 studies on literacy and 43 studies on mathematics. These include both *descriptive, nonintervention (nonexperimental)* studies of the actions that families take at home and at school and *intervention (both experimental and quasi-experimental)* studies of programs that help structure fami-

lies' engagement in activities that could strengthen or increase young children's literacy and math learning.

Unfortunately, only a limited number of intervention studies have used rigorous, experimental designs. Chapter 2, on family involvement in reading and literacy activities, reports on 9 individual intervention studies and more than 120 interventions included in 8 meta-analyses. Chapter 3, on family involvement in math activities, reports on 7 intervention studies and more than 20 intervention studies included in 2 meta-analyses. These studies embrace varying standards of evidence. Although some use randomized control trials (RCTs), the vast majority of individual intervention studies do not provide enough information about analytic or methodological weaknesses, such as not using an intent-to-treat analysis or not reporting on intervention implementation or study design flaws (that might result, for example, in differential attrition). Nevertheless, these studies do provide useful guidance when determining the future directions of family involvement research. (Appendix Tables A.1 and A.2 provide details about all the reviewed studies.)

The family involvement research on both literacy and math were divided into four categories to reflect how parents support their children's learning in a variety of ways and in different settings (Epstein, 2011; Epstein et al., 2009):¹

1. **Learning activities at home.** These studies focused specifically on the home activities that parents engage in to promote literacy, math, or both (or more general academic activities). These activities may also occur wherever children learn with their parents, such as in libraries, museums, and family resource centers.
2. **Family involvement at school.** These studies examined the actions and interactions that parents and other family members have while at the school building (for example, during an open house or parent-teacher conference, while participating in the classroom, or volunteering).
3. **School outreach to engage families.** These studies examined the strategies and practices that schools and teachers use to engage families and make them feel welcome. Special attention was paid to the processes that schools used to prepare preschool children and families for the move to kindergarten.

¹Epstein, J. L. (2011). *School, family, and community partnerships: Preparing educators and improving schools* (2nd ed.). Westview Press.

Epstein, J. L., Sanders, M. G., and Sheldon, S., Simon, B. S., Salinas, K. C., Jansorn, N. R. (Rodriquez), Van Voorhis, F. L., Martin, C. S., Thomas, B. G., Greenfield, M. D., Hutchins, D. J., and Williams, K. J. (2009). *School, family, and community partnerships: Your handbook for action* (3rd ed.). Thousand Oaks, CA: Corwin Press.

4. **Supportive parenting activities.** These studies examined activities that parents conduct to support their children’s development and well-being, including the nature and quality of the parent-child relationship; parenting activities, such as setting rules at home; and caring behaviors that characterize the home environment in general. This is in contrast to parents’ conducting specific literacy or math activities at home with their children.

Research Results

Across the studies reviewed, we were able to draw two main conclusions. First, the majority of studies — including some RCTs — demonstrate that family involvement is positively linked to children’s literacy and math skills in preschool, kindergarten, and the early elementary grades. A few studies also show increases in children’s social-emotional skills. The weakest link was between family involvement at school and children’s outcomes.

Second, the most rigorous studies that use random assignment show that parents from diverse backgrounds, when given direction, can become more engaged with their children on literacy and math activities — and that their children can increase their reading and math skills, on average, more so than children whose parents are operating without support or direction.

These studies demonstrate that family-focused intervention has small-to-moderate effects on children’s learning. Note, however, that the study designs varied and that only five studies demonstrating positive effects also employed the gold standard from which to draw causal conclusions: random assignment. Eight other studies had comparison groups but not random assignment and also demonstrated positive results, providing additional, yet cautious, confidence in the conclusions. Importantly, these conclusions indicate that there is much more to be learned in the field of family involvement and early childhood, and they point to the need for more rigorous work in this area.

Implications for Improving Practice

Although more research is needed to fully understand family involvement, its impact on young children’s early reading and math skills and readiness for school, and the implications for practice, a number of lessons are emerging that can immediately inform the field.

The studies in this review indicate that, with guidance, many parents — across all socioeconomic, educational, and racial or ethnic backgrounds — are interested in and able to conduct learning activities at home with their young children. Parents and their children engaged in a host of activities (including shared book reading, dialogic reading, home tutoring, and family conversations), and these activities were related to positive results for children’s vocabulary, listening comprehension, rates of word reading, story comprehension, and other reading skills.

Similarly, when parents and their children are engaged in various math-related activities — such as counting, playing with shapes and puzzles, money math, and addition and subtraction — such activities are associated with positive results on children’s math knowledge and skills across a variety of assessments.

The interventions that were both sustained and targeted were the most effective. Interventions that lasted for longer periods of time and that were clearly defined in relation to outcomes that logically flow from a theory of change were associated with greater gains in achievement.

Many preschools and elementary schools are implementing involvement activities with families to strengthen children’s reading and math skills and to improve the transition process from preschool to kindergarten. Appendix B summarizes a few of the hundreds of activities that have been implemented by practitioners in schools in the National Network of Partnership Schools (NNPS) at Johns Hopkins University and that are reported in annual books of Promising Partnership Practices.

But the connection between research findings and their practical implications can be strengthened even further to promote greater and more equitable parental involvement. Some parents conduct activities that support and increase their young children’s learning without any encouragement, but the studies in this review demonstrate that all parents can be more involved in literacy and math activities. Parents may not be aware of which activities to conduct and how to conduct them to support their young children’s literacy and math skills and school behaviors, so schools and teachers need to take an active role in engaging all families. Preschools and elementary schools, community groups, and leaders must be intentional about including families as an integral part of their school or program philosophy. This outreach is important for all parents — and especially so for those whose children are most at risk of having learning problems.

Implications for Future Research

Regardless of the type of family involvement and the methodological design of these studies, the results reveal critical insights that can direct future research:

- **More studies are needed that specifically identify which family involvement practices and which school outreach strategies are most effective for all students and families, specific subgroups of students and families, and at varying grade levels.** In addition, studies should examine fathers’ (and mothers’) roles in family involvement, potential moderators to ascertain whom or under what conditions interventions are effective, and the mechanisms by which family involvement works to influence children’s learning.

Finally, more research — particularly, experimental work — needs to report on the fidelity of implementation of a program or intervention model.

- **More well-designed, rigorous experimental studies are needed that examine immediate and cumulative effects of family involvement interventions.** The literature review found few experimental studies compared with nonexperimental studies, and, even within the experimental ones, there were varying levels of evidence with (unreported) analytic or methodological weaknesses. In addition, most studies paid minimal attention to measuring fidelity of implementation to the intended model of family involvement. Ideally, future experimental studies would use random assignment and an intent-to-treat analysis; would report on fidelity of implementation; and would include theoretically linked child outcome measures, which would provide stronger evidence of a positive impact of specific family involvement activities on particular child outcomes. Finally, studies should examine both immediate and *cumulative effects* of interventions across age and grade levels.
- **Studies that use longitudinal data can show how the trajectory of family involvement changes as children develop and how that may relate to specific outcomes.** Studies based on cross-sectional data can demonstrate the relationship between family involvement and children’s outcomes at one point in time, but longitudinal studies can measure *change* in family involvement and the dynamics between family involvement and outcomes over time. The studies reviewed in this report show not only that family involvement does matter at one point in time but also that positive *change* in family involvement is associated with better outcomes.
- **More research should examine the link between family involvement and both math and social-emotional skills.** Compared with literacy studies, fewer studies examined the effects of family involvement on math, and even fewer focused on social-emotional skills. Often, measures of children’s social-emotional skills were casually added onto studies without a strong theoretical rationale, which dilutes the importance of these kinds of critical skills that help children understand and control their feelings and get along with peers and teachers.
- **Future studies should examine how to expand and scale up the research-tested programs and practices of family involvement with children on reading and math activities.** The ultimate goal is to understand how to scale up good practices that will help a significantly large number of parents become involved in productive, feasible, and fun ways to help their children’s

learning and development. We need more studies that examine the processes necessary to scale up effective interventions, moving the conduct of treatment and control group practices from researchers' tight controls to real-world tests of teachers' practices.

- **Studies should align specific family involvement activities — as well as measures of them — with explicit child outcomes.** Many studies illustrate that highly specific measures of family involvement are more likely linked to positive child outcomes, in contrast to studies that use composite measures of family involvement, which tend to confound the separable types of involvement (Epstein, 2011). For example, studies that examine whether parents are engaged in guided reading and math activities help to produce specific results for students in reading and math. Conversely, composite outcome measures (such as combined reading and math test scores) tend to obscure an understanding of whether and which family involvement actions contribute to particular learning outcomes.
- **Studies should pay more attention to the transition from preschool to kindergarten.** Several nonintervention studies indicate that specific, well-planned strategies and welcoming practices not only help children and their parents adjust to a new school but also are associated with better child outcomes.

Conclusion

More children attend preschool and all-day kindergarten than ever before, and the strong push for universal preschool education by various policymakers suggests that the number will continue to increase.

Educators are being urged by federal, state, and local institutions to use research-based or evidence-based approaches to improve their practices around family involvement so that they can produce positive results for all children. This review strengthens the position that interventions to bolster family involvement are likely to be part of the solution when the goal is to improve children's early learning. It offers several important recommendations — for both researchers and educators — that guide the next steps in an important policy agenda of promoting children's development and learning.

Chapter 1

Introduction

It is well established that parents matter greatly for their children's development and success both in and out of school. Yet there are no manuals or sure strategies for raising happy, caring, confident, and successful children. Parents do their best with the information that they have or receive to teach their infants to walk and talk, help toddlers learn and play, and help young children get ready to succeed in school. Teachers, too, work diligently to foster their students' academic achievement and social and emotional development. As they work with good intentions to guide their children, parents and teachers experience many bumps in the road.

Research has been accumulating for decades on the importance of high-quality pre-school education to prepare children for their journey through school (Reynolds, 2000; Reynolds, Temple, Robertson, and Mann, 2001). At the same time, for more than 30 years (Kagan, 1984; Epstein, 1995; Becker and Epstein, 1982), research on family and community involvement has shown that children are more successful in school when their parents and teachers communicate well and work together effectively (Epstein, 2011; Henderson, Mapp, Johnson, and Davies, 2007). Countless studies indicate that, at any grade level, including prekindergarten, challenging curriculum, important learning goals, effective assessments, responsive feedback for students, *and* parental involvement are important for increasing student achievement, attendance, behavior, and other important school outcomes (Bryk, Sebring, Allensworth, Luppescu, and Easton, 2011; Marzano, 2003; Sheldon, 2003). Although the relevant studies vary in size, duration, data collected, and methods of analyses, the body of literature points in one direction: Children benefit when parents and teachers work together as partners in education.

Despite the generally positive findings of hundreds of studies, the application of research findings in homes and schools is rare, often occurring with families who are already engaged and sometimes without attention to what has been learned to be particularly effective in research. Popular media have played a role in helping to educate parents on ways to support children's development, making it easier for parents to understand, internalize, and apply general research findings (such as Capretto, 2012; Feiler, 2012; Larsen and Rodgers, n.d.). For example, more parents now than in the past read with their young children and conduct other evidence-based early reading and math activities with infants and toddlers. The percentage of prekindergarten children (ages 3 to 5) who were read to frequently by a family member (that is, three times or more in the week preceding the survey) increased from 78 percent in 1993 to 86 percent in 2005 (U.S. Department of Education, 2006). Over this time period, parents or other family members also were more likely to frequently tell their children stories (from 43 percent in 1993 to 54 percent in 2005); work with their children on letters, words, and numbers (from 58 percent to 77 percent); and teach their children songs or music (from 41 percent to 54

percent). Although family poverty level affected the number of students read to by a parent (90 percent of children in families over the poverty line, compared with 78 percent of children in families below the poverty line), there were no significant differences by poverty level in parents' telling stories; working with letters, words, or numbers; and teaching songs to their children. In these data, parental involvement with children on "letters, words, and numbers" is combined in one composite, making it impossible to identify a trend in parents' engagement with young children on math readiness specifically. Over time, however, the trend is noticeable: In the past 20 years, parents of young children are engaging in more "best practices" for supporting children's competencies, demonstrating that change in family involvement is possible, given sufficient information and widespread dissemination.

Early learning experiences at home may be initiated by informed parents and/or may be guided by children's preschool teachers. The findings above suggest that, regardless of their economic circumstances, parents conduct reading readiness activities with their children. Still, a large proportion of parents are unsure about the best way to engage in other reading-related activities with their children at particular age and grade levels. Even more are uncertain how to interact with their children on math activities (Pan, Gauvain, Liu, and Cheng, 2006), especially when the way in which math is taught differs from how it was taught when the parents were in school. Many studies indicate that nearly all parents agree that they want more and better guidance from teachers on how to help their children at home on specific skills as their children progress through the grades (Epstein, 2011; Pianta, Kraft-Sayre, Rimm-Kaufmann, Gercke, and Higgins, 2001; Van Voorhis, 2011). These concerns loom large for parents of preschool children because they know that their children's early education sets the trajectory for success or problems in school (Weiss, Caspe, and Lopez, 2006).

This social landscape prompts important questions: What aspects of how families are involved in their children's learning — such as learning activities at home or involvement at school — are important for children's learning? What are the early learning activities that parents can do with their children that are most related to learning and development? What is needed to help more parents — indeed, all parents — conduct activities that enable their children to gain the skills and positive attitudes that they need to be "ready" for preschool and kindergarten? What can parents do on their own and what information and guidelines do they need to conduct learning activities with their children at home and at school? What can preschool and kindergarten teachers, and other professionals in the community, do to guide parents in conducting enjoyable and useful activities to promote children's learning and development?

This report summarizes research that addresses these questions. It examines the effects of family involvement activities at home and at school — as well as the ways in which schools and teachers engage families in their children's learning — on literacy, mathematics, and social-emotional skills for children ages 3 to 8. It presents what is known now and what

remains to be learned on this important agenda in new research and in practice. The report has three main goals:

- **Review.** Update and expand prior reviews of the effects of family involvement on the literacy, math, and social-emotional skills of children by examining the most current and rigorous research across the past 10 years (through 2012) and by placing a focus on young children in preschool, kindergarten, and the primary grades
- **Inform.** Provide new information on the impact of family involvement on literacy, math, and social-emotional readiness skills specifically for preschool children
- **Discuss.** Discuss the implications of the extant research for education practice and for future research and development

It is important to note the various terms used in the field and in research on this topic area. For the purposes of this report, the terms “involvement” and “engagement” are used interchangeably. And while we recognize that many individuals in a family may play important roles in the child’s learning at home and at school, most studies examine parents — particularly, mothers — or caregivers; therefore, we also use the words “family” and “parent” interchangeably. Finally, in this report, “children” and “students” are used synonymously.

Method: Criteria for Selection of Articles

This report reviews descriptive, nonintervention (nonexperimental) studies and intervention (both experimental and quasi-experimental) studies conducted primarily over the past decade on the effects of family involvement activities on literacy, mathematics, and social-emotional skills for children ages 3 to 8. Because of the breadth of the topic, the authors limited the search to studies published in peer-reviewed journals between 2000 and 2012 with samples of more than 30 subjects (including students, teachers, parents, and parent-child dyads). Criteria were set to select studies that framed clear research questions about aspects of family involvement in young children’s literacy, math, and social-emotional development; used strong research methods that were appropriate for the questions, with special attention to experimental studies that examined interventions; and studies that collected longitudinal data on family involvement and student outcomes. Because fewer studies have been conducted on family involvement in math (compared with reading), some studies were included in the math review that were outside the original criteria (age range, time frame, and sample size) in order to be comprehensive. Additional details on the search criteria are explained in each section. The criteria ensured that the review and summary of the literature would be based on the best available information at this time.

The intensive search for studies that fit these criteria took on many forms. We reviewed available bibliographic lists of journal articles on family involvement compiled by the Harvard Family Research Project (HFRP; www.hfrp.org) published from 2000 to 2006 and in 2009 and 2010 as well as early childhood publications from 1999 to 2005. These resources yielded over 300 references on family involvement in reading or math, from which we selected several articles that met our criteria. To supplement these resources, we searched online databases — including ERIC, JSTOR, PsycINFO, Google Scholar, and Teachers’ Reference Center — using such key words as “family/parent involvement,” “family/parent engagement,” “parent/school relationship,” “family/parent participation,” “home learning environment,” “math/numeracy or reading/literacy,” and “preschool or elementary.”

Report Overview

The report summarizes results of 95 studies of family involvement practices on young children’s literacy and math learning and social-emotional skills: 52 studies of family involvement in literacy and 43 studies of family involvement in math. These include *descriptive, nonintervention* (nonexperimental) studies of the actions that families take at home and at school and *intervention* (both experimental and quasi-experimental) studies of systematic practices that guide families to conduct activities that strengthen or increase young children’s literacy and math learning. Chapter 2, on family involvement in reading and literacy activities, reports on 9 individual intervention studies and more than 120 interventions included in 8 meta-analyses. Chapter 3, on family involvement in math activities, reports on 7 intervention studies and more than 20 intervention studies included in 2 meta-analyses. It is important to note that there are different levels of evidence across these studies. The report notes whether studies were randomized control trials (RCTs) or not; however, the vast majority of individual intervention studies (even RCTs) do not provide enough information to fully determine any analytic or methodological weaknesses, including not using an intent-to-treat analysis and not reporting on intervention implementation or study design flaws, such as whether there was differential attrition.

Within both Chapters 2 and 3, the literacy and math studies are grouped into four categories of family involvement:

1. **Learning activities at home.** These studies focused specifically on literacy home activities, on math home activities, or on general academic home learning activities (for example, math *and* literacy). It should be noted that families’ promotion of learning activities are not limited to the home and may occur wherever children learn, such as in libraries, museums, and family resource centers.

2. **Family involvement at school.** These studies examined the actions and interactions that parents and other family members have at the school building (for example, during an open house or parent-teacher conference, while participating in the classroom, or volunteering).
3. **School outreach to engage families.** These studies examined the strategies and practices that schools and teachers use to engage families and make them feel welcome. Special attention was paid to family involvement in transition processes that prepare preschool children and families for the move to kindergarten.
4. **Supportive parenting activities.** These studies examined activities that parents conduct to support their children’s development and well-being, including the nature and quality of the parent-child relationship; parenting activities, such as setting rules at home; and caring behaviors that characterize the home environment in general. This is in contrast to parents’ conducting specific literacy or math activities at home with their children.

These categories reflect the foci of all research indicating that parents support their children’s learning in a variety of ways and in different places — at home, at school, and in their community (Epstein, 2011; Epstein, Sanders, Sheldon, Simon, Salinas, Jansorn, Van Voorhis, Martin, Thomas, Greenfield, Hutchins, and Williams, 2009). In each category, intervention (experimental and quasi-experimental) and nonintervention (nonexperimental) studies are reviewed separately, and particular studies are highlighted as “feature” studies because they present important findings and/or summarize research on that topic.

The rest of this report is organized as follows: *Chapter 2* discusses family involvement in reading and literacy activities and results for children’s literacy achievement and social-emotional skills. *Chapter 3* examines family involvement in math activities and results for children’s math achievement and social-emotional skills. And *Chapter 4* presents a summary, reflections, and recommendations.

Table 1.1 outlines the general characteristics across all the studies reviewed in the literacy and math sections (Chapters 2 and 3). The report also includes three appendixes. *Appendix A* provides details about each reviewed study in the chapters on literacy (Appendix Table A.1) and math (Appendix Table A.2), with information about the form of family involvement, study citation, age of children, study design and sample characteristics, results and measures for children’s cognitive and social-emotional skills, and other results of interest. *Appendix B* includes three tables that summarize selected practical activities used in the field that reflect the results of research. *Appendix C* is a glossary of research and evaluation terms. Finally, the *References* are organized into three lists by chapter, for easier identification.

Family Involvement Literature Review

Table 1.1

Description of Journal Articles for Literacy and Math Reviews

	Articles Reported in Chapter 2, Literacy Section (<i>N</i> = 52)	Articles Reported in Chapter 3, Math Section (<i>N</i> = 43) ^a
<u>Age span (%)</u>		
Preschool	46	33
Kindergarten	33	35
Starting in first grade and higher	6	9
Starting in fourth grade and higher	0	19
Meta-analyses	15	4
<u>Method/design (%)</u>		
Longitudinal	84	51
Intervention	34	23
ANOVA/ <i>t</i> -tests/chi-square/correlations	25	28
Regression/path	44	40
Multilevel analysis	15	28
Effect sizes only	15	5
<u>Sample size (%)</u>		
40 or fewer	6	14
41-100	17	23
101-550	37	23
551-5,000	13	14
5,000 or more	12	14
Other notations of size	15 ^b	12 ^c
<u>Publication date</u>		
2012	17	9
2010-2011	19	26
2008-2009	21	7
2005-2007	15	26
2002-2004	21	12
2000-2001	6	12
1992-1998	0	9

NOTES: Some of the studies are directly related to a particular age span, but the authors may identify outcomes from the study in later elementary school or even high school. Ten studies included in the math section (Chapter 3) are international studies.

^aBecause fewer studies on family involvement in math were found than studies in literacy, criteria for inclusion were extended to include studies published since 1992, with children beyond grade 3, and with smaller samples sizes.

^bThese are meta-analyses with an average number of 30 studies each.

^cThese studies reported number of schools at 1, 18, or 39. Two meta-analyses included 15 and 25 studies.

Chapter 2

Family Involvement in Reading and Literacy Activities and Results for Children's Literacy Achievement and Social-Emotional Skills

Chapter 2 summarizes research regarding family involvement with young children in literacy activities. The 52 studies reviewed include 24 preschool studies (46 percent), 17 kindergarten studies (33 percent), 3 first-grade-and-beyond studies (6 percent), and 8 meta-analyses (15 percent). (See Table 1 in Chapter 1 and Appendix Table A.1 for, respectively, general characteristics of and specific details about the studies.) Noteworthy is the fact that 8 of the 24 preschool studies followed students beyond preschool, as did 7 of the 17 kindergarten studies. The results of the studies were published between 2000 and 2012, and all had sample sizes of 30 or more, ranging from 30 to 21,255. The largest percentage of studies (37 percent) include samples of 100 to 500 participants. About one-third (17) of the studies were interventions to increase family involvement in activities linked to reading with students, and over 80 percent (44) of the studies included longitudinal measures of students' reading or social-emotional skills.

Researchers used various appropriate methods for their study designs, including regression analyses or path modeling (23 studies); hierarchical linear modeling (HLM) (8 studies); and other methods, such as analysis of variance / analysis of covariance (ANOVA/ANCOVA) (8 studies), t-tests (2 studies), correlations (2 studies), and chi-square tests (1 study). The meta-analyses reported summary statistics and effect sizes for more than 230 studies (8 meta-analyses). The variety of designs and methods enabled us to look across well-planned studies for consensus or confirmation of patterns of results of family involvement activities on student literacy achievement and social-emotional outcomes. Appendix Table A.1 summarizes each of the 52 studies of literacy-linked family involvement, presenting information on the form of parental involvement, study citation, age of children, study design and sample characteristics, results for children's cognitive (reading) skills, social-emotional skills, and other results of interest.

Across the preschool and early primary grades, most studies focused on questions about family involvement in *learning activities at home* (39 percent) and *at school* (29 percent). Another focus was on *supportive parenting* activities, in general (22 percent), followed by a subset of studies using general or *composite measures of family involvement both at home and at school* (9 percent). Most studies reported results for more than one literacy and/or behavior outcome.

There were interesting differences in the foci of studies that were conducted at the preschool and kindergarten levels. A striking — but logical — contrast indicated more studies of family involvement in learning at home (49 percent) than at school (23 percent) at the preschool level, compared with more studies of family involvement at school (42 percent) than at home (24 percent) at the kindergarten level. This pattern was recently captured in a longitudinal study by Powell, File, and Froiland (2012).

The following pages in Chapter 2 focus on four categories of family involvement and their relations with children’s literacy learning: *learning activities at home*, *supportive parenting*, *family involvement at school*, and *school outreach to engage families*. They summarize the research findings in each of the four family involvement categories, highlight “feature” studies that present important findings and summarize research on a topic, and discuss implications for future research and practice.

Family Involvement in Literacy Learning Activities at Home

Several studies measured literacy-linked activities that parents (mainly mothers) conducted at home with their young children. Measures included frequencies, such as number of books read at home, how often parent and child read together, and visits to the library; shared reading and dialogic reading interventions (discussed below); home teaching of literacy skills (such as practicing ABCs, sounding out words, asking questions about pictures in a book); mealtime and play conversations; and *elaborative reminiscing* (that is, parents’ conversational storytelling with their children about past events).

Description of Studies: Learning Activities at Home

About half (28) of the studies in this review focused on literacy activities that parents conducted with their children at home, mostly at the preschool level. These studies focused on a multitude of topics areas, including different reading activities at home and parent-child conversations at home. Eleven of these studies were interventions, and the rest were analyses of large data sets (6) or researchers’ samples (10). Combined, this collection of studies provides an up-to-date picture of the results for students of parent involvement with literacy learning activities at home in the preschool, kindergarten, and early elementary years.

Intervention Studies

Of the intervention studies, five were meta-analyses that included intervention and non-intervention studies of home-based reading programs and shared/dialogic reading strategies (Mol, Bus, de Jong, and Smeets, 2008; Sénéchal and Young, 2008; van Steensel, Herppich, Kurvers, and McElvany, 2011; Jeynes, 2012) or of parent training for helping with or checking

homework (Jeynes, 2012; Patall, Cooper, and Robinson, 2008). The other six interventions were small-scale explorations of a preschool-level eight-week dialogic reading program (Fielding-Barnsley and Purdie, 2003); a preschool-level adaptation of Home Instruction for Parents of Preschool Youngsters (HIPPY) for Dutch students lasting two years (van Tuijl and Leseman, 2004); a preschool-level program to teach parents to conduct elaborative reminiscing or dialogic reading with children conducted over five months (Reese, Leyva, Sparks, and Grolnick, 2010); a series of 25 one-hour kindergarten-level literacy workshops for parents, which provided such resources as Leap Pads to use at home (St. Clair, Jackson, and Zwieback, 2012); a family literacy program lasting one school year for Canadian parents and first-grade students (Saint-Laurent and Giasson, 2005); and a first-grade phonics program with initial workshops for parents and weekly “Words to Go” activities conducted over one year (Reutzel, Fawson, and Smith, 2006).

Nonintervention Studies

Six nonintervention studies were based on analyses of existing large-scale data sets. Researchers used data from the Early Head Start Research and Evaluation Project (Chazan-Cohen, Raikes, Brooks-Gunn, Ayoub, Pan, Kisker, Roggman, and Fuligni, 2012) and the Head Start Family and Child Experiences Survey (FACES) (Hindman and Morrison, 2011). Others analyzed data from the National Early Head Start Research and Evaluation Project (Mistry, Benner, Biesanz, and Clark, 2010; Rodriguez, Tamis-LeMonda, Spellmann, Raikes, Lugo-Gil, and Luze, 2009) and the Early Childhood Longitudinal Study of Kindergarten Cohort (ECLS-K) (Crosnoe and Cooper, 2010; Galindo and Sheldon, 2012).

The remaining 10 studies represented researcher-defined samples to address questions of home learning in preschool, kindergarten, and first grade and above. These were studies of 126 preschool children of young African-American mothers in the Newark Young Family Study within the Teenage Parent Demonstration Program (Britto, Brooks-Gunn, and Griffin, 2006); 229 preschool children (Hindman and Morrison, 2012); 140 preschool children (Powell, Son, File, and San Juan, 2010); 79 mothers of preschool children (Weigel, Martin, and Bennett, 2006); 144 preschool children enrolled in Head Start in the urban Northeast (Fantuzzo, McWayne, Perry, and Childs, 2004); 143 Australian preschool children followed through second grade (Hood, Conlon, and Andrews, 2008); 53 low-income children attending preschool or Head Start (Weizman and Snow, 2001); 42 preschool children followed to ages 9 or 10 (Hart and Risley, 2003); 307 African-American kindergarten children (many who attended Head Start) (McWayne, Hampton, Fantuzzo, Cohen, and Sekino, 2004); and 168 children in kindergarten and first grade followed through third grade, mostly from English-speaking white families in Ontario, Canada (Sénéchal and Lefevre, 2002).

Research Findings: Reading and Literacy Activities at Home

Dialogic and Shared Reading

Because of the consistently positive reports of motivational and achievement benefits for young children, shared book reading and related home literacy discussions and activities have been called an “essential aspect of responsible parenting” (McBride-Chang, 2012). There is widespread agreement and support within education, psychological, medical, and business communities and among the general public to encourage parents and children to read together. There are different ways to promote literacy discussions, such as through dialogic reading and shared reading. *Dialogic reading* is a specific form of interactive shared reading in which the adult serves as a guide and active listener and helps the child become the storyteller. This is different from the general paradigm for shared reading in which an adult reads a story and the child listens. Dialogic reading may activate a “*PEER*” sequence, whereby the parent begins by prompting (P) the child to talk about something in or related to the book. Then, the parent evaluates (E) the child’s response and expands (E) the response by rephrasing or adding information. Finally, the parent or adult repeats (R) the prompt in an effort to ensure that the child has learned something from the expansion. Other dialogic strategies include asking a child to recall and retell a story after it is read or to think about how the illustrations tell what is happening in a story. *Who, what, where, when, and why* questions help a child think about the story, the pictures, and the ideas. Other prompts ask children to make connections with their own experiences. For example, if an adult were reading a book about a vacation with a young girl, the adult reading partner might ask the child to think about her last vacation and what made that time special (Whitehurst, Arnold, Epstein, Angell, Smith, and Fischel, 1994).

Shared reading includes an adult reading a book to a single child or small group of children without requiring much interaction, whereas *interactive shared reading* involves an adult reading a book and using a variety of techniques, including systematic dialogic strategies of asking children questions to engage them in the book (Trivette and Dunst, 2007).

Meta-Analyses

Overall, the meta-analyses found moderate, but impressive, effect sizes ranging from $d = 0.51$ to $d = 0.65$ reported by Jeynes (2012), Mol and colleagues (2008), and Sénéchal and Young (2008), while a small effect size ($d = 0.18$) was reported in the study by van Steensel and colleagues (2011). (Effect sizes vary by context, but it is generally accepted that an effect size is large at 0.8 [that is, 8/10 of a standard deviation unit], moderate at 0.5, and small at 0.2; Cohen, 1988). These meta-analyses indicate positive results of reading interventions and home literacy activities on children’s early literacy and language skills. The studies controlled potentially

important variables, such as type of parental involvement activity, age of child, children's reading risk factors, and amount or time of parent training.

Sénéchal and Young (2008) conducted a meta-analysis of 16 home-based literacy interventions in both experimental and quasi-experimental studies and reported a moderate and positive effect size on children's reading acquisition between kindergarten and third grade ($d = 0.65$). This represented a 10-point gain in standardized test scores for children exposed to home-based activities, compared with children who lacked those experiences. Among the interventions, certain types of learning activities at home had stronger effects, including home tutoring ($d = 1.15$) and listening to children read ($d = 0.52$). There were no differences due to age or grade level, with similar effects being found for students in kindergarten through grade 3.

There were differences in effects of the interventions due to the time that parents spent in training sessions, with shorter sessions (1 to 2 hours) relating to stronger effects for children ($d = 0.97$) than longer training sessions (3 to 13.5 hours) ($d = 0.37$). Although, initially, this seems counterintuitive, the differential results may have to do with shorter training sessions having a clearer purpose regarding what tasks to conduct at home. This kind of unexpected result requires that intervention studies pay more attention to the link between content duration of parent trainings and resulting behaviors and outcomes for students. In addition, new technologies (for example, Web-based training sessions and downloadable materials) may be useful for providing short sessions and guidelines to parents to conduct basic reading activities with their young children at home.

Positive results also were reported in a study of 16 dialogic reading intervention programs (Mol et al., 2008). These experimental or quasi-experimental interventions had positive, small-to-moderate effects on students' overall vocabulary skills ($d = 0.42$; Mol et al., 2008). The authors reported a stronger effect of dialogic reading on students' expressive vocabulary (oral expression; richness of spoken vocabulary) ($d = 0.59$) and a smaller effect on students' receptive vocabulary (understanding of spoken works) ($d = 0.22$). In contrast to the review by Sénéchal and Young (2008), Mol and colleagues (2008) found smaller effects for older children ages 4 to 5 ($d = 0.14$) than for younger children ages 2 to 3 ($d = 0.50$). Also, at-risk children from families with low income or low maternal education — and, therefore, at risk for language and literacy impairments — benefitted less from (or responded less quickly to) ($d = 0.13$) the intervention than children who were not at risk ($d = 0.53$).

Another meta-analysis of some of the same and some newer studies of parents and children reading together reported a positive and moderate effect ($d = 0.51$) on student achievement (Jeynes, 2012). The intervention and nonintervention studies included various programs that encouraged parents and children to read together or an adult reading to a small group of children, not necessarily dialogic strategies.

A final, sizable meta-analysis explored the effects of 30 intervention studies of family involvement with literacy at home (van Steensel et al., 2011). Parents attended workshops to learn to conduct activities at home with their children to strengthen specific reading readiness skills. These included code-related skills (such as letter identification, concepts about print, rhyme, alphabet knowledge, reading rate, and spelling) and comprehension-related skills (such as vocabulary, storytelling, and writing). The authors reported small but significant effects of parents' engagement with students on both sets of skills ($d = 0.17$ and $d = 0.22$, respectively). Effects were strongest for programs combining shared reading with other activities ($d = 0.21$) compared with shared reading ($d = 0.05$, NS [not significant]) or literacy exercises ($d = 0.17$) alone. Programs lasting five months or longer ($d = 0.21$) produced significantly stronger effects than those lasting fewer than five months ($d = 0.13$).

Overall, the meta-analyses of intervention and nonintervention studies of dialogic reading and other literacy learning activities at home reported consistently positive results for students. The results strongly suggest that it would be beneficial to guide all families in productive ways to enjoy reading and literacy readiness activities with their preschool and kindergarten children.

Some studies indicate that dialogic reading techniques may be particularly effective with 2- and 3-year-olds and that, with guidance, parents can conduct and enjoy these interactive reading strategies with their children. Other studies indicate that preschool students with serious risk factors will need focused interventions that are appropriate for their age and ability so that their reading readiness will grow on a positive slope over time.

With increasing enrollments of 3- to 5-year-olds in full-day preprimary education (in nursery school and kindergarten) (U.S. Dept. of Education, 2012), young children are and will be expected to have higher reading readiness skills and positive attitudes about reading and learning than they were expected to have in the past. It seems plausible to believe that if teachers had ways to help more parents support their children's reading skills and attitudes with feasible and fun activities at home and if parents had the time and support to do them, more children would be ready to build their reading skills in the early primary grades.

Box 2.1 features a study of family involvement in reading activities at home that benefited young children's reading readiness and abilities through third grade.

Intervention Studies

Five nonrandomized studies reported results of interventions for parents to conduct literacy-linked activities with children at home on preschool-level reading readiness skills (Fielding-Barnsley and Purdie, 2003; van Tuijl and Leseman, 2004); first-grade outcomes (Reutzel,

Box 2.1

Feature Study: Family Involvement in Reading Activities at Home

A study by Sénéchal and Lefevre (2002) indicated that different reading-related activities at home, starting in the early years, were associated with specific kinds of reading readiness skills at the preschool level and had direct and indirect long-term links to reading abilities through third grade. The authors conducted a descriptive study of 168 kindergarten and first-grade children in Canada to understand how parental engagement with children in reading books together and doing other reading and writing activities at home affected student outcomes over time. First, children's *exposure to books* at home related positively to their vocabulary and listening comprehension skills in kindergarten and grade 1. These skills, in turn, directly related to children's reading ability in grade 3. Second, parents' involvement in *teaching specific reading and writing* skills at home related directly to other early literacy skills, predicted rates of word reading at the end of first grade, and related positively to children's reading ability at the end of third grade.

A series of fixed-order hierarchical regression analyses identified these paths of effects, which, as in the meta-analyses reported here, indicated that exposure to books, shared reading, and attention to specific reading readiness skills at home benefitted students' reading skills over time. Other researchers have tested the influence paths that were identified by Sénéchal and Lefevre (2002) and reported similar results (Hood, Conlon, and Andrews, 2008).

Fawson, and Smith, 2006; Saint-Laurent and Giasson, 2005); and long-term effects for fifth- and sixth-grade students' achievement (St. Clair et al., 2012). The interventions included various forms of parent-teacher communications, networking among parents, and a focus on writing in conjunction with reading. Also reviewed was a randomized study on Play and Learn Strategies (PALS), a parenting curriculum designed to increase effective shared book reading (Landry, Smith, Swank, Zucker, Crawford, and Solari, 2012).

In one intervention with kindergarteners, trained research assistants showed parents videotapes of other parents and students modeling dialogic reading techniques. Parents also were given written guidelines on dialogic reading strategies and eight books to read and reread five times with their children. Kindergarten students in the intervention group showed significant positive improvement (from February to November) in spelling and reading as well as on concepts about print (CAP) (Clay, 1979) and final consonant identification, compared with control group students (Fielding-Barnsley and Purdie, 2003). This underscores the importance of providing multiple forms of information on dialogic reading to parents and specific guidelines for interactions with their children. The clarity and intensity of the intervention may explain students' gains in spelling and reading achievement.

Researchers found that migrant children who experienced an intervention for family involvement on reading activities at home in kindergarten had significantly higher reading skills in fifth and sixth grades compared with a control sample of students (St. Clair et al., 2012). This intervention included 25 one-hour sessions for parents during the students' year in kindergarten. The sessions covered educational topics, such as how to work with students on specific skills in the kindergarten curriculum (for example, letter of the week, sight words, and themes in stories) and time for parents to “network” with each other. Staff who were experienced in working with migrant families modeled ways for parents to interact with their children in reading. In addition, families in the intervention group could borrow resource materials (for example, Playstation equipment, Light Span AchieveNOW software, Leap Pads, Leap Desks, and books) and sample descriptions of how to use them at home with their children on reading activities (St. Clair et al., 2012).

This intervention showed the benefit of helping parents focus on the same learning goals in the kindergarten curriculum that students were working on in school, and it provided new and useful equipment for use at home. Building in time for parents to network with each other made the goal-linked training sessions more social for the participants and established connections that showed that other parents would be working with their children in the designated ways.

A yearlong intervention in Canada that aimed to improve first-grade students' literacy skills also showed positive effects on student's outcomes. Nine 90-minute sessions for parents were led by researchers over the school year (Saint-Laurent and Giasson, 2005). The parent sessions addressed topics of students' book reading at home and school success. Parents were guided to visit the library with their children, play with letters, write plays, and do other reading and writing activities. In each session, leaders asked parents for feedback on the literacy activities suggested in the previous session, presented a new theme, discussed with parents their attitudes and apprehensions about conducting the activities at home, demonstrated activities, guided parents' practice with children in day sessions or in evening role-play activities, and summarized the session. The intervention families also received written guidelines and materials to use at home (for example, a scrapbook, plastic letters, and a notebook for a student journal). Compared with students in the comparison group, students in the literacy program intervention had significantly higher scores on specific measures of sentence structure skills, vocabulary, spelling, and length of their written narratives. They also performed significantly better on general reading and writing tests after the intervention. This illustrates that well-planned, focused workshops for parents are important for producing positive reading and writing results for students.

The three nonrandomized interventions summarized above were designed with a clear vision that parents could reinforce students' literacy skills at home with well-focused, goal-

linked activities. All showed sustained commitments to parents over time; multiple creative methods for conveying information in day and evening sessions; live, videotaped, and written forms of communication; provision of related and enriching equipment or materials for use at home; and opportunities for parents in similar circumstances to meet each other and network. These components likely contributed to more parents conducting literacy-linked activities with their children at home, which, if continued in focused ways from grade to grade, should improve students' reading attitudes and performance in reading, writing, and other literacy skills.

The randomized study of Play and Learning Strategies (PALS) — a parenting curriculum for increasing shared book reading — reported small-to-moderate increases in mothers' praise and encouragement of their preschool children ($d = 0.34$) and large increases in mothers' verbal support for demonstration of problem-solving skills ($d = 0.86$) (Landry et al., 2012). This study suggests that early and sustained interventions may be best. With the random assignment of mothers to four treatment groups, the researchers found the strongest results on positive parenting and evidence of shared reading when mothers participated in the intervention when their children were infants and toddlers, compared with mothers participating in the intervention during one time period or mothers in the control group. Sustained guidance by an intervention helped mothers conduct enjoyable and age-appropriate interactions — such as shared reading — which set the children on a more positive path for learning in school and potentially set the mother-child relationship on a positive path that could last from preschool to elementary school and beyond. When mothers saw their infants respond to reading together, they may have been encouraged to continue their close connections and reading together. By contrast, if mothers are unsure or unable to establish these connections, and they persist with awkward or negatively laden interactions with their infants and toddlers, the mothers may retreat and avoid shared reading and other connections with their children's learning at home.

Box 2.2 features the PALS study and illustrates that learning activities at home and supportive parenting actions can overlap and reinforce each other, to young children's benefit.

Parent Involvement in Homework

Two studies reported results of parent involvement with students on homework in the early grades. One meta-analysis of family and school partnership programs reported that intervention and nonintervention studies of parents checking homework had a small, positive effect ($d = 0.27$) on students' overall achievement (Jeynes, 2012). Another meta-analysis reviewed 14 studies of the effects of training parents to be positively involved with their children on homework, reporting improved homework completion rates of elementary children ($d = 0.22$) and a small, significant, and positive effect on students' academic achievement ($d = 0.23$) (Patall, Cooper, and Robinson, 2008). The results suggest that, as they move from

Box 2.2

Feature Study: Effects of Parent Intervention on Play and Learning Strategies (PALS) on Achievement and Social-Emotional Skills

An intervention study by Landry and colleagues (2012) explored the results of Play and Learning Strategies (PALS) — a parenting curriculum to increase effective shared book reading. PALS provided videotaped demonstrations of mothers and children in everyday activities, such as feeding, dressing, and playing. PALS sessions, designed for parents of infants (PALS I: about 6 months old) and parents of toddlers (PALS II: about 24 to 28 months), required 10 and 12 weekly sessions, respectively. The researchers randomly assigned 166 mothers and children who were expected to be at high risk for literacy problems to one of four intervention groups: PALS in both infancy and toddlerhood, PALS in infancy and control group in toddlerhood, control group in infancy and PALS in toddlerhood, and control group in both infancy and toddlerhood.

The authors measured the effects of PALS on mothers' behaviors in shared book reading. The strongest effects were reported for mothers who participated in PALS during both developmental stages — infancy and toddlerhood. For these mothers, there were significant small-to-moderate effects, including increased use of open-ended prompts ($d = 0.38$) and language facilitation techniques ($d = 0.30$) during shared reading sessions. Also, there were large effects for mothers' verbal support of students' problem-solving skills ($d = 0.86$) and strong moderate effects on increased engagement or enthusiasm in reading ($d = 0.65$) for PALS families over non-PALS families.

The PALS-prompted maternal behaviors were linked to higher-level language responses by their children, including more comments during the book reading task ($d = 0.23$) and more cooperative behavior, compared with non-PALS I students ($d = 0.92$). In addition, children whose mothers had PALS I and II intervention showed more engagement and enthusiasm about the shared reading activity than did children in the PALS I-only group ($d = 0.65$). Overall, children born with very low birth weights benefited from their mothers' participation in the parenting intervention as much as children born full term, with the strongest impact for those whose mothers were in the intervention at both infancy and toddlerhood. Positive changes in children's shared reading behaviors were mediated by mothers' supportive behaviors.

Learning activities at home and supportive parenting actions sometimes overlap and reinforce each other, as shown in this featured study. Warm and loving parent-child relationships may promote and affect parent-child interactions on such learning activities as shared reading. Interventions that blend aspects of positive parenting and enjoyable approaches to learning activities at home appear to be likely to produce stronger results for young children than either interaction alone.

preschool to the elementary grades, students may be more motivated to learn if their parents know about and enact specific roles in the homework process.

Summary: Reading and Literacy Learning Activities at Home

Overall, the studies summarized above in this section suggest that children at the preschool level and early elementary grades show increased achievement and specific literacy skills if their parents conduct interactive/dialogic reading strategies, do other shared reading activities at home, and tutor or help students practice emergent literacy skills.

The extant studies do not, however, answer all important questions about effects for students of parents' involvement at home on literacy learning. In particular, there are too few studies that address such questions as: Which skills are most dramatically helped by interactions or practice with a parent at home? Which students are most helped by these interactions? What is the best way to prepare more and diverse types of parents to conduct shared reading and other literacy-related activities with their children at home?

Research Findings: Parent-Child Conversations at Home and Literacy Development

The majority of studies of family involvement at home focus on reading interventions and on helping parents to teach, tutor, or practice literacy skills with their children. Other studies are accumulating that demonstrate the power of rich, cognitively demanding family conversations in book reading and family storytelling on children's language and literacy development (Bond and Wasik, 2009; Reese et al., 2010; Weizman and Snow, 2001). These studies highlight the importance of parent-child conversations — talk and interactions at home — for children's literacy outcomes and have important implications for educators. If educators used research findings on specific conversational strategies and book reading when creating materials and guidelines for parents, they could help busy parents use their limited time to conduct a balanced mix of natural conversations, shared book reading, and practice on specific reading readiness skills with their children.

Box 2.3 explores which particular aspects of parent-child conversations can promote children's literacy achievement.

Research Findings: Family Involvement in Learning Activities at Home (Multiple Measures)

Ten preschool and kindergarten studies analyzed the effects of parents' conduct of literacy-linked activities at home (such as reading with children, providing cognitively stimulating materials, singing songs) in conjunction with one or more other measures of family involvement

Box 2.3

Feature Studies: Parent-Child Conversations at Home

Two studies shed some light on what particular aspects of parent-child conversations can promote children's literacy achievement. Weizman and Snow (2001) analyzed the frequency and type of vocabulary used in over 1,000 mother-child conversations between 53 low-income parents and their 5-year-old children in five different home settings: toy play, magnet play, mealtime conversation, information book reading, and storybook reading. The authors found that although all settings offered children opportunities to hear sophisticated maternal vocabulary (for example, such words as "vehicle," "cholesterol," "predictability"), mealtimes and toy play offered the highest frequency of such words. In fact, the settings of toy play, magnet play, and mealtime generated 20 sophisticated word tokens — nearly seven times as many sophisticated word tokens as were generated in the book reading settings.

Overall, the density of sophisticated words (the ratio of unique words to the number of words) spoken by mother, or embedded in helpful or instructive interactions between mother and child at home, independently predicted over one-third of the variance in children's vocabulary scores (Peabody Picture Vocabulary Test-Revised [PPVT-R]) in both kindergarten and second grade. The density and helpfulness of vocabulary — along with mother's education, child's nonverbal IQ, and amount of child's talk in the home settings — predicted as much as 50 percent of the variance in children's second-grade vocabulary scores, measured by the PPVT-R.

The 2001 findings, summarized above, were supported and extended by a study of an intervention at the preschool level involving 33 low-income parents of 4-year-olds in Head Start (Reese et al., 2010). One group of parents was trained by the researchers in a technique called "elaborative reminiscing," in which parents and children discussed shared past events. Another group of parents was trained in dialogic reading techniques. Parents in a control group received neither intervention. The interventions were modeled by mothers on videotape and were shared via laptop computers with each group of participants. For five months, parents in the elaborative reminiscing and dialogic reading intervention groups kept logs of their conversations and book reading with their children.

After controlling for key child and mother covariates, elaborative reminiscing had a significant effect on the quality of children's narrative, compared with dialogic reading. But children in the elaborative reminiscing intervention did not differ significantly on the quality of their narrative from control group students, though tending in the expected direction. The elaborative reminiscing intervention had a small positive effect on students' story comprehension, compared with dialogic reading and control group students. There were no differences between the intervention group and the control group on print skills, story recall, or expressive vocabulary.

(for example, general parenting, volunteering at school). These studies revealed how literacy learning activities at home compared with the other kinds of involvement to influence young children's learning.

Seven of the studies were conducted at the preschool level, and six of these reported positive effects of selected measures of family engagement on preschool students' outcomes.

- The home learning environment — measured by the Learning and Literacy subscale of the Home Observation for Measurement of the Environment (HOME) — was positively associated with preschool students' vocabulary and letter-word identification skills (Chazan-Cohen et al., 2012).
- Home stimulation of language (also measured by the HOME) was positively related to a composite score of preschool students' reading, math, and vocabulary measures (Mistry et al., 2010).
- Hindman and Morrison (2011) demonstrated that, over and above a series of control variables, children of parents who more often were involved at home in teaching about letters and words had better gains during preschool in decoding skills, which are used to make sense of printed words. These authors (2012) also noted that parents who conducted more home learning activities (such as teaching letter sounds and letter names, reading words, helping children with writing and math games and activities) had preschool children who exhibited higher levels of alphabet knowledge and decoding skills.
- Parents' reports on a 13-item measure of the home learning environment were positively correlated with preschool students' receptive vocabulary and were the only significant predictor of children's receptive vocabulary (as measured by the Peabody Picture Vocabulary Test, PPVT-III) when other family involvement dimensions (that is, home-school conferencing and school-based involvement) were included in the effects model (Fantuzzo et al., 2004).
- Higher levels of home literacy activities (such as being read to a few times a week or daily, singing nursery rhymes, visiting a children's museum) and provision of home learning activities (books, toys requiring eye-hand coordination) were positively and significantly associated with cognitive and language scores on the Bayley Mental Development Index (MDI) and PPVT-III at 14 months, 24 months, and 36 months (Rodriguez et al., 2009).
- One study at the preschool level that used multiple measures of parental engagement reported no effects on early reading skills of preschoolers (Powell

et al., 2010). The study may have been limited by its lack of longitudinal data for analyses of effects.

Three of the ten multidimensional studies of family involvement conducted at the kindergarten level examined the effects of literacy activities conducted at home separately from other types of parental involvement. Two reported positive associations of home learning and achievement outcomes (Crosnoe and Cooper, 2010; McWayne et al., 2004). One reported no relationship between learning at home and reading-related kindergarten student outcomes (Galindo and Sheldon, 2012).

The Crosnoe and Cooper (2010) and Galindo and Sheldon (2012) studies both used ECLS-K data but reported different results. This may be explained by the measures of parents' activities with their children at home that were used in the different analyses. Galindo and Sheldon used a general or composite measure of involvement at home, whereas Crosnoe and Cooper used two specific measures of cognitively stimulating materials at home and parenting rules and routines. The general measure resulted in null effects, whereas the specific measures each related to positive and significant associations with reading.

Box 2.4 features a study showing that children in high-poverty areas and those with problem behaviors can benefit from several layers of support, including the family, school, and community.

Research Findings: Effects of Family Involvement in Learning Activities at Home on Social-Emotional Skills

Thirteen studies of the connections of family involvement in reading and learning at home reported results for children's social-emotional behaviors. Eleven of these included samples of preschool students. It is generally agreed that young children's social skills affect cognitive skills and school learning and vice versa. Here, we add information that, across studies, family engagement with students in learning at home affected students' behavior, such as increased ability to self-regulate (Mistry et al., 2010); motivation to learn, attention, and persistence with difficult or challenging tasks (Fantuzzo et al., 2004); higher levels of cooperation and positive interactions with peers at home and at school (Hindman and Morrison, 2012; McWayne et al., 2004); reduced problem behaviors (Fantuzzo et al., 2004; Mistry et al., 2010); reduced hyperactivity (Fantuzzo et al., 2004); improved school readiness skills (Britto et al., 2006); increased time in shared book reading and more frequent language activities at home (Weigel et al., 2006); and higher levels of social-emotional support from mothers (van Tuijl and Leseman, 2004).

Two of the thirteen studies reported null results for the relationship between parental involvement at home and student behavior (Powell et al., 2010; van Tuijl and Leseman, 2004).

Box 2.4

Feature Study: Multiple Measures of Family Involvement in Learning Activities at Home Versus Other Types of Family Involvement

Utilizing a large, extant database and specific, multiple measures of family involvement, Crosnoe and Cooper (2010) examined child protective and risk factors and their relations to kindergarten students' reading skills. Based on the Early Childhood Longitudinal Study's Kindergarten (ECLS-K) data set of over 17,000 kindergarten students, the researchers' strongest multilevel model showed significant effects of the school the child attends, children's characteristics, family resources, teachers' credentials, and type of instruction on children's reading achievement. Specifically, young children's reading skills were strongly influenced by the average poverty rate of the school; the child externalizing behaviors (such as physical aggression, bullying, theft vandalism); the child's internalizing problem behaviors (depression, anxiety, withdrawal); parents' mental health (depression); the families' cognitively stimulating home materials; rules and routines at home; the teacher's elementary certification; tenure in grade-level taught; and use of whole language instruction.

This study reinforces the fact that schools in high-poverty areas and those with high concentrations of children with internalizing problem behaviors (depression, anxiety, withdrawal) and externalizing problem behaviors (physical aggression, bullying, theft, vandalism) can benefit from several layers of support, including the family, school, and community. The families may also benefit from referrals for mental health instruction.

In fact, the latter study reported mixed results, finding that an intervention was effective in increasing mothers' emotional support for their children in parent-child interactions but that it had no effect on increasing the quality of instruction in the parent-child interaction.

Box 2.5 features a study in which language skills at home were found to be positively associated with preschool students' achievement, and maternal warmth was associated with fewer problem behaviors.

Summary: Results of Family Involvement in Literacy Activities at Home for Student Achievement and Social-Emotional Skills

Across the studies reviewed above in this section, the overwhelming majority reported positive results of parents' engagement with students on learning at home for students' reading readiness and literacy learning in preschool, kindergarten, and the elementary grades. The

Box 2.5

Feature Study: Effects of Family Involvement at Home on Learning and Behavior

The research of Mistry and colleagues (2010) is instructive for understanding the effects of family involvement activities at home on preschool students' social and cognitive outcomes. The authors analyzed data from a diverse sample of 1,851 students and families (38 percent white, 33 percent African-American, and 23 percent Latino) in the National Early Head Start Research and Evaluation Project. They analyzed the connections of measures of cumulative family and child risk factors assessed during infancy and preschool with children's preschool achievement (that is, measures of math, vocabulary, and emergent literacy skills assessed by the Woodcock-Johnson tests and the Peabody Picture Vocabulary Test [PPVT]), self-regulatory skills, and social behavior.

The authors reported that children's exposure to risk factors in infancy had negative effects on all readiness skills in preschool. However, positive changes through toddlerhood and preschool in parental warmth and home literacy stimulation (measured by the Home Observation for Measurement of the Environment [HOME]) related to higher levels of achievement and self-regulation abilities for preschool children and lower incidents of problem behavior. For example, activities that stimulated preschool students' language skills at home were positively associated with preschool students' achievement, and maternal warmth was associated with *fewer* problem behaviors.

studies reviewed in this section reported that parent-child interactions at home were associated with students' increased *code-related skills*, including:

- Print knowledge and preschool phonological awareness (Cottone, 2012; Fielding-Barnsley and Purdie, 2003; Weigel et al., 2006)
- Preschool alphabet knowledge and decoding (Fielding-Barnsley and Purdie, 2003; Hindman and Morrison, 2011)
- Spelling rates and letter-word identification (Hood and Andrews, 2008)
- Initial and final consonant recognition of preschoolers (Fielding-Barnsley and Purdie, 2003)
- Code-related skills, in general (van Steensel et al., 2011)

Positive parent-child interactions at home were associated with students' increased *comprehension-related literacy skills*, including:

- Active or receptive preschool vocabulary development (Britto et al., 2006; Chazan-Cohen et al., 2012; Fantuzzo et al., 2004; Hindman and Morrison, 2012; Hood and Andrews, 2008; Mistry et al., 2010; Mol et al., 2008; Rodriguez et al., 2009; Sénéchal and Lefevre, 2002; Tamis-Lemonda, Shannon, Cabrera, and Lamb, 2004; van Tuijl and Leseman, 2004; Weizman and Snow, 2001)
- Preschool narrative comprehension and quality (Reese et al., 2010)
- Comprehension-related skills, in general (van Steensel et al., 2011)

Other studies reported positive associations of parent and child learning activities at home with *reading acquisition* (Sénéchal and Young, 2008; St. Clair et al., 2012); preschool students' interest in reading (Weigel et al., 2006); and overall preschool, kindergarten, and elementary achievement (Crosnoe and Cooper, 2010; Jeynes, 2012; McWayne et al., 2004; Mistry et al., 2010; Raver, Gershoff, and Aber, 2007; van Steensel et al., 2011). Finally, the PALS study demonstrated improved parent and child preschool reading behaviors (that is, mothers using more praise and encouragement and children asking more questions and being more engaged in reading activities) (Landry et al., 2012).

Null Findings

Four studies reported null results (no significant associations) between family involvement with children on learning activities at home and students' achievement outcomes. In one study, although children with mothers who taught literacy skills at home had higher print knowledge skills than did children whose mothers conducted "mothering as usual," there were no differences between the two groups on emergent writing skills (Weigel et al., 2006). Another study found that family involvement at home was unrelated to preschool students' early reading (Woodcock-Johnson Letter-Word Identification), mathematics (Woodcock-Johnson Applied Problems), or language (PPVT-III) (Powell et al., 2010).

One intervention study in which mothers learned elaborative reminiscing techniques reported no difference between preschool students in the intervention and control groups on expressive vocabulary, story recall, or print skills (Reese et al., 2010). Finally, there were no significant associations between a general, composite measure of family involvement at home with student math and reading gains in kindergarten (Galindo and Sheldon, 2012).

The preponderance of research evidence points to a positive link between family involvement with students on learning activities at home and reading-related skills, attitudes, and

experiences and many measures of preschool students' literacy skills and social behaviors. The most notable results are reported in carefully crafted studies with longitudinal data.

Next Steps

Overall, studies show that parents' involvement with students in rich conversations at home and on constructive reading-related skills, attitudes, and experiences has significant and positive effects on many measures of preschool children's literacy skills, other achievements, and social-emotional skills. These findings emerged *because*, within study samples, there were critical differences in parents' levels of knowledge, time, and resources for structuring and engaging in these activities with their children. The variations in parents' actions — some induced by interventions and some naturally occurring — produce the reported research results.

Although more research is needed to delve deeply into details — especially to determine whether general patterns are reproduced for diverse populations of students at different ability levels — enough is known for educators to apply the results of research in practice. The results have important implications for improving early education and the chances for more children not only to be “ready” for school but also to perform well in later grades. Presently, some parents conduct literacy-related actions and interactions that increase their children's learning. The intervention studies reveal that all parents could do so.

Parents — often with limited time at home — need and want clear information, ideas, and guided practice to interact with their children in effective ways. The extant studies that included diverse populations of families living in poverty indicated that even families in distressed economic situations can respond to clear and feasible ideas for conducting basic and enjoyable reading activities with their children in the preschool and elementary years. One next step then suggests that outreach to parents should include those whose children are most at risk for language lags and reading delays. This is particularly important given evidence that when parents are provided good, clear information to support children's learning and development at home, they are responsive. Given these findings and the fact that the achievement gap starts early, persists, and widens (Baydar, Brooks-Gunn, and Furstenberg, 1993; Phillips, Crouse, and Ralph, 1998) throughout children's educational careers, pursuit of this goal is an important endeavor that has the potential to put children on an early and positive path to learning.

Family Involvement at School

“Family involvement at school” refers to the actions and interactions that parents and other family members have at the school building. This includes attending open-house events and parent-teacher conferences, volunteering for tasks at the school, and serving in classrooms as tutors, helpers, or guest lecturers and on field trips or in other locations; participating in work-

shops at school; and attending or leading PTA/PTO meetings or other committees. At the preschool and kindergarten levels, activities at school also include orientations and discussions about transitions to a new school or grade level, as discussed below in the section entitled “School Outreach to Engage Families.”

Description of Studies: Family Involvement at School

Of the 50-plus studies on parental involvement with young children on literacy-linked activities, 17 focused on family involvement at school. Half of these related to preschool students, and the other half related to families of students in kindergarten or the early elementary grades. Some studies (9 of the 17) included multiple measures of parental involvement at school and at home. The results of these studies strengthen knowledge about parents’ engagement with their children’s teachers and other staff at school, and they inform educators about practices that may be used or adapted to engage all families in ways that support their children’s learning.

Three studies were interventions, including one meta-analysis of many intervention and nonintervention studies of involvement at school from preschool through high school (Jeynes, 2012); another meta-analysis of randomized studies of parental volunteers from preschool through eighth grade (Ritter, Barnett, Denny, and Albin, 2009); and one focused intervention at the preschool level on reading and writing (Aram and Biron, 2004). Three other studies examined parent involvement at school at the preschool level. One used the Head Start Family and Child Experiences Survey (FACES) (Hindman and Morrison, 2011); another included a diverse sample of 140 preschool students (Powell et al., 2010); and a third included 144 children enrolled in a Head Start Center in the urban Northeast (Fantuzzo et al., 2004). Five studies of kindergarten students included two using ECLS-K data (Crosnoe and Cooper, 2010; Galindo and Sheldon, 2012); a study of 223 kindergarten children in the NICHD study of Early Child Care (Rimm-Kaufman, Pianta, Cox, and Bradley, 2003); a study of 72 Canadian kindergarten teachers (Lynch, 2010); and a study of 307 African-American kindergarten students who had attended Head Start (McWayne et al., 2004).

Three longitudinal studies followed students across grade levels, including a study of 72 low-income Spanish-speaking Mexican-American families following kindergarten students to the third grade (Tang, Dearing, and Weiss, 2012); a study of 281 children from kindergarten to the fifth grade (Dearing, Kreider, Simpkins, and Weiss, 2006); and a study of 187 low-income preschool students through third grade (Englund, Luckner, Whaley, and Egeland, 2004).

Research Findings: Family Involvement at School

Intervention Studies

A major meta-analysis of over 50 intervention and nonintervention studies (Jeynes, 2012) reported significant, small-to-moderate effects on student achievement of parent and teacher collaborative programs ($d = 0.35$) and systematic parent-teacher communications ($d = 0.28$). There were small, positive, but nonsignificant effects on student achievement of English as a Second Language programs for parents ($d = 0.22$).

Ritter and colleagues (2009) reviewed 21 interventions concerning tutoring volunteers that randomly assigned children in kindergarten through the middle grades to treatment and control groups. The researchers reported significant, small-to-moderate effect sizes of community volunteer tutoring on students' reading scores ($d = 0.30$), reading letters and words (decoding skills) ($d = 0.41$), and writing skills (spelling, number of words written or spelled correctly in a writing sample) ($d = 0.45$).

An Israeli study of preschool children in a low-income community involved a reading intervention for 35 children, a writing intervention for 36 children, and a control group of 24 children (Aram and Biron, 2004). University student volunteers met at school with intervention groups of 4 to 6 students for 20 to 30 minutes on focused reading or writing activities, whereas students in the control group had regular reading and writing activities in class. The intervention groups of students completed about 66 sessions with the volunteers. Parents of the intervention students were invited for two workshops on encouraging students' reading or writing activities.

In the reading intervention, preschool children discussed 11 children's books and conducted related drama and other creative activities. In the writing intervention, the preschoolers focused on creative activities and games to improve letter knowledge, phonological awareness, and functional writing activities. Children practiced writing in innovative ways and learned to recognize their own written name, their friends' names, and word segmentations. They turned their practice work into a functional project: a phonebook of names and numbers of their classmates. Although there were some missing measures for the control group, the children in both intervention groups progressed significantly more than control group students on orthographic awareness (for example, rules for letter order, letter-sound correspondence, and mental images of written words). There were no significant differences on students' listening comprehension.

The results of the Ritter meta-analysis and the study by Aram and Biron converged to provide positive support for parent and community volunteers or mentors on children's literacy outcomes — specifically, for helping children with lagging skills. Aram and Biron's study alerts educators that community volunteers, college students, and parents all may serve as helpful

volunteers, particularly if they are guided by the classroom teachers to conduct well-planned, goal-linked activities to directly assist students who need extra time and encouragement to master basic skills. The findings of these interventions suggest that parent-teacher communications and tutoring interventions with parent and other volunteers in reading and writing at the preschool and kindergarten levels may increase young children's skills and positive attitudes about school and learning.

Research Findings: Multi-Measure Studies of Family Involvement at School

Nine studies used multiple measures of family involvement at school to study their connections with students' reading and literacy skills and behavior. One, using HLM analyses, reported mixed results, showing family involvement at school to be associated with children's better social skills ($d = 0.55$) and *fewer* problem behaviors ($d = -0.47$) but unrelated to children's receptive vocabulary (Powell et al., 2010).

Another preschool study that measured several aspects of parental involvement found no significant effects of involvement at school (for example, volunteering and parent-teacher conferences) on children's receptive vocabulary (PPVT-III), learning behaviors (that is, competence motivation, attention and persistence, and attitude toward learning) as measured by the Preschool Learning Behaviors Scale (PLBS), or behavior problems as measured by the Conners' Teacher Rating Scale-28 (Fantuzzo et al., 2004).

Other studies also reported mixed or contradictory results of aspects of involvement at school. For example, parents' direct school contact was positively related to students' sense of responsibility and to less hyperactivity (McWayne et al., 2004). A study by Rimm-Kaufman et al. (2003) showed positive results of family involvement at school with kindergarten students' language skills but no significant relationships with seven measures of students' behavior.

Box 2.6 features a study showing that when family involvement increased over time, kindergarten through fifth-grade students' literacy skills improved, compared with students' whose families' involvement remained the same or declined over time.

Summary: Results of Family Involvement at School on Student Achievement and Social-Emotional Skills

There were 22 positive results for student outcomes reported in studies of family involvement at school (15 on achievement and 7 on social-emotional skills, out of 17 studies).

Box 2.6

Feature Study: Effects of Family Involvement at School Over Time

Although few studies have analyzed patterns of family involvement over time, Dearing, Kreider, Simpkins, and Weiss (2006) studied family involvement at school and its relation to the literacy skills of 281 low-income, ethnically diverse students from kindergarten to grade 5. The researchers examined mothers' reports of their involvement at school when their children were in kindergarten, third, and fifth grades. The eight-item measures asked "yes/no" questions about the parents' attendance at parent-teacher conferences, visits to the child's classroom, and attendance at school performances, field trips, PTA meetings, volunteering in the classroom, and so on.

When family involvement *increased* over these years, students improved their literacy skills ($pr = 0.23$, indicating a small but significant effect), compared with students' whose families' involvement remained the same or declined over time. Family involvement at school was more strongly linked to students' literacy skills and gains in literacy skills than was family income, maternal education level, or ethnicity. Interestingly, the gap in initial literacy skills of children whose mothers had more formal education, compared with children whose mothers who had less formal education, disappeared when family involvement was high. The study's measures and reports of longitudinal patterns of results are important, although yes/no questions are, usually, weaker than response categories that require reports of the frequency of the activities (such as how often the parent volunteers, attends meetings, and so on).

Achievement in Preschool

- Parents' volunteering at the preschool level positively related to students' vocabulary skills (Hindman and Morrison, 2011).
- Parents' perceptions and reports of teacher responsiveness to parents and children positively related to students' early reading skills (for example, letter and word recognition) (Powell et al., 2010).
- A reading and writing intervention at school with university student volunteers and parent workshops resulted in significantly higher preschool students' orthographic awareness skills (Aram and Biron, 2004).

Achievement in Kindergarten and Above

- Partnership programs had small-to-moderate effects on overall achievement (Jeynes, 2012).
- Family involvement at school positively related to kindergarten students' reading achievement (Galindo and Sheldon, 2012).
- Family involvement at school positively related to kindergarten students' language skills (Rimm-Kaufman et al., 2003).
- Parent-initiated involvement at school predicted kindergarten students' academic achievement (that is, composite scores on reading, math, and general knowledge) (Schulting, Malone, and Dodge, 2005).
- Increased levels of family involvement at school in kindergarten through fifth grade were associated with higher levels of literacy achievement (Dearing et al., 2006).
- Increased family involvement over time in elementary school related positively to students' literacy skills in third grade, especially for struggling readers. The rate of the increase in family involvement between kindergarten and first grade was greater for children with Spanish-speaking bilingual teachers (Tang et al., 2012).
- Parental involvement at school in third grade added significantly to third-grade achievement (Englund et al., 2004).

Preschool Social-Emotional Skills

Parent involvement at school was linked to students' good behavior (generally reported as a negative association with problem behaviors) and positively related to students' social skills (Powell et al., 2010).

Kindergarten Social-Emotional Skills

- Direct family-school contact was associated positively with student responsibility (McWayne et al., 2004).
- More direct family-school contact was positively associated with student cooperation (McWayne et al., 2004).

- More direct family-school contacts were linked to lower student hyperactivity (reported as a negative association with hyperactivity) (McWayne et al., 2004).
- School outreach and transition practices were positively associated with parents' school involvement (Galindo and Sheldon, 2012; Schulting et al., 2005).

Null Findings

A few studies reported nonsignificant results of family involvement at school for achievement or behavior. In some of these studies, other measures were associated with significant positive results, as reported above.

Preschool

- There was no significant relationship between parental involvement at school with preschool students' scores on the PPVT (Powell et al., 2010).
- Separate measures of parent involvement at school *and* parent-teacher conferencing had no effect on students' receptive vocabulary skills if parent involvement at home was included in the model (Fantuzzo et al., 2004).
- Family involvement at school and participation in parent-teacher conferences had no significant relationships with measures of students' learning behaviors when home-based involvement was included in the model (Fantuzzo et al., 2004)
- A measure of family involvement at school was unrelated to seven measures of students' behaviors and social skills and behaviors in kindergarten (Rimm-Kaufman et al., 2003).

Kindergarten

- Parents' contacts with teachers were unrelated to kindergarten students' academic competence (McWayne et al., 2004).
- Parent involvement at school had no significant association with students' reading skills in kindergarten (Crosnoe and Cooper, 2010).
- Family involvement activities at school were unrelated to kindergarten students' social skills (whether well-liked or disliked by peers), whether children were prone to start fights with peers, and observed student self-reliance.

A negative association of family involvement at school and students' behavior problems is reported (Rimm-Kaufman et al., 2003) but should be questioned due to apparent ridge regression issues in the analyses and because it is an anomaly among many studies.

Although studies summarized in sections above strongly confirmed that parental support and involvement *at home* benefited young children's learning, the studies of family involvement *at school* painted a mixed picture of results for students. In the nonintervention studies, mixed results may be due to the survey items that were available for secondary analyses in large-scale data sets that were not developed to comprehensively answer the questions we want to answer. Moreover, the lack of longitudinal data limited researchers' options to control important background variables and starting points on student outcomes *prior to* the measure of involvement behavior and resulting outcomes.

Measures of involvement at school in large-scale data sets are often very general, with items that have different meanings. For example, some researchers simply classify items on outreach to parents to attend a PTA meeting or a parent-teacher conference as "involvement at school." These actions have different meanings for parents of children who are having learning problems in school. Unless involvement at school is goal-linked (such as measuring outreach and actions of reading volunteers for their tutee's reading skills versus a comparison group), researchers should not hypothesize that just "any" measure of family involvement will influence students' learning (Epstein, 2011). Future research on family involvement at school must be clearer about the theoretical connections of the measure of engagement with the outcome of interest. For example, if the question is whether involvement helps students improve behavior and school discipline, then measures of family involvement at school to help students produce those behaviors will be more likely to produce positive results for this outcome than unrelated involvement behaviors at the school building. Studies that contrast goal-linked involvement activities and general measures with particular outcomes will help to better understand these issues.

School Outreach to Engage Families

"School outreach to engage families" refers to the strategies and practices that schools and teachers use to engage families and make them feel welcome. These strategies and practices may look different, depending on the age of the child. Three related, nonintervention studies addressed transition issues from preschool to kindergarten, including one with a sample of 132 parents of children enrolled in early childhood education (McIntyre, Eckert, Fiese, DiGennaro, and Wildenger, 2007); an ECLS-K study (Schulting et al., 2005); and a descriptive study of 3,595 kindergarten teachers (Early, Pianta, Taylor, and Cox, 2001). These studies reported results of practices designed to help students and their families make successful transitions to

kindergarten, and focused on one goal-linked way that parents become involved at school. Measures included information on parents' concerns about the transition, teachers' transition practices, and the effects of transition programs on student adjustment to kindergarten and academic achievement.

Research Findings: Family Concerns About Transition to Kindergarten

McIntyre and colleagues (2007) studied the concerns and experiences of 132 parents with children who were transitioning to kindergarten from a preschool program. Parents wanted to be actively involved in preparing their child's "readiness" for kindergarten and in planning for the transition. Most parents had concerns about the information they needed (74 percent) or about the new school's academic program and expectations for behavior (53 percent). They wanted to help their children learn to follow directions at school (72 percent), make their needs known to others (52 percent), prepare to separate from the family (37 percent), and get along with their new teacher (35 percent). The study indicated that families receiving financial or other kinds of aid were significantly less likely than other families to attend meetings at the preschool, communicate with preschool teachers, visit the child's future kindergarten classroom, or gather information about kindergarten. The study showed that all parents wanted to understand and help their children with the transition process and wanted to share their concerns with their children's preschool educators. Importantly, some parents needed teachers to tailor their outreach activities so that they could help their children transition to kindergarten.

Research Findings: Teachers' Conduct of Transition Activities

In a national survey of over 3,500 kindergarten teachers, Early and colleagues (2001) investigated teachers' transition activities and found five prominent practices for communicating with *individual* students and families or with *whole groups* either *before* the school year began or *during* the school year:

- 29 percent of teachers conducted individual activities before the school year started with each family whose child was transitioning into kindergarten (examples: home visits, phone calls to meet).
- 59 percent of teachers implemented practices before the school year started to communicate with all families of students transitioning into kindergarten (examples: letter to parents and letter to children before school, Open House night or day activities, kindergarten registration).
- 44 percent of kindergarten teachers conducted individual activities after the school year started with each family or selected families of students in need

of extra help (examples: home visits, conversations with a child's parent, facilitating contacts between and among parents of children in the class).

- 65 percent of teachers implemented practices after school started to communicate with the families of all students in the class (examples: letters or notes to parents or children, Open House after school starts).
- 36 percent of teachers made coordinated efforts before school started with the “feeder” preschool programs and other community groups (examples: obtaining written records for each child entering kindergarten, visiting preschool programs for 4-year-olds in the community, conducting regularly scheduled formal meetings or informal contacts with preschool teachers about the “rising” children, inviting preschool teachers to bring their students to visit the kindergarten class, working together with preschool educators to develop a coordinated curriculum for easing the transition to kindergarten).

More kindergarten teachers conducted transition and welcoming activities with and for all parents and children in the class after the school year started than before. Fewer were engaged in collaborative work with the “feeder” preschools that sent their students to kindergarten. The activities varied by size of class, as teachers of larger classes implemented fewer individual or group activities before school started. Teachers who received their class lists earlier than the average of 15.4 days before school started implemented more individual and group transition activities before the year began than did other teachers. More teachers who had kindergarten or primary-grade certification conducted more individualized practices than did teachers with other kinds of training, and more of those who had some professional development on the transition process (22 percent) reported using more of all types of transition practices. High-quality teachers and those with goal-linked professional development conducted more responsive practices to help parents and their children make successful transitions to kindergarten.

Research Findings: Effects of Transition Activities on Children's Achievement

A few studies examined the effects of preschools' transition activities on parents' participation and children's achievement. Using the ECLS-K data from 992 schools and over 17,000 kindergarten students, Schulting and colleagues (2005) identified teacher-reported use of seven different school transition practices including:

- Provide information about kindergarten via phone or mail (86 percent)
- Conduct orientation session for parents prior to the school year (76 percent)

- Invite parents and children to visit kindergarten prior to the start of the school year (76 percent)
- Invite preschoolers to spend time in the kindergarten classrooms (39 percent)
- Shorten school days at the beginning of the school year to ease transition (18 percent)
- Visit students' homes at the beginning of the year (4 percent)
- Other transition activities (26 percent)

Overall, teachers reported using an average of 3.4 of these practices; fewer were used in schools serving families with low income. Using a three-level *hierarchical linear model (HLM)* that accounted for the “nesting” of children within classes and within schools, these authors found that more transition practices predicted more family involvement, with involvement increasing for families with low income as teachers increased the number of transition activities that they conducted (Schulting et al., 2005).

This study also revealed that schools' transition practices *and* parents' school involvement were positively and significantly associated with kindergarten students' composite achievement scores of reading and math and general knowledge. In particular, the transition practice of children and parents visiting kindergarten classrooms before school started had a significant main effect on achievement, and the largest impact was on students from families with low income. The results point to the need for kindergarten teachers to conduct feasible and thoughtful practices to engage and inform families and students to ease the transition to kindergarten, with expected benefits for students' achievement in kindergarten.

Implications of Transition Studies for Practice and Research

As more students attend preschool in the United States, more will be transitioning from the home to preschool to kindergarten every year. Many kindergarten teachers, based on their schools' policies, fail to conduct activities to guide students and their families through a successful transition from preschool to kindergarten in elementary school.

Given that few studies of the important transition process have been conducted, research is needed — particularly, well-designed interventions — to understand the effects of specific transition activities on family involvement and student outcomes. The existing studies, however, are clear that professional development for teachers about the transition process and time to plan and conduct transition activities would help many more preschool and kindergarten teachers to connect with parents and prepare young children to move to a new school.

A recent report from the Harvard Family Research Project highlights activities in six states (California, Georgia, Maryland, Minnesota, New Jersey, and Virginia) where state and local education leaders are working together to improve the transition process to kindergarten (Patton and Wang, 2012). Suggested activities include surveys of parents' concerns about upcoming transitions; a "transition team" of preschool teachers, parents, kindergarten teachers, community providers, and others to meet monthly and plan and evaluate kindergarten transitions; articulation teams of teachers to examine and bridge course content in preschool and kindergarten; summer transition programs for students; parent education about the transition process and students' new schools through information and Web sites; and aligned professional development for teachers. This project may illuminate different ways to form effective transition teams, engage families to increase their comfort with the transition process, increase the positive response of families to varied transition activities, and determine the effects of the transition activities and family engagement on student success in kindergarten.

Research Findings: Teachers' Roles in Family Involvement at School

Five studies examined teachers' roles in promoting family involvement at school (Hindman and Morrison, 2011; Jeynes, 2012; Lynch, 2010; Powell et al., 2010; Tang et al., 2012). They focused on teachers' communications with and invitations for parents to be involved at school and at home.

Across studies in a meta-analysis, communications between parents and teachers were positively associated with overall student achievement ($d = 0.28$) (Jeynes, 2012). One study that used multilevel (HLM) analyses (Powell et al., 2010) found that, at the preschool level, parents' perceptions of the responsiveness of their child's teachers (based on a scale with nine items, such as whether the teacher takes an interest in the child, whether the child gets a lot of individualized attention, whether the teacher is warm and affectionate toward the child, and whether the child is treated with respect by the teacher) was related to children's early reading skills positively ($d = 0.43$), problem behaviors negatively ($d = -0.61$), and social skills positively ($d = 0.43$).

Two other studies show the power of school outreach. A study of Head Start Centers indicated that when these school programs reached out to families about children's reading readiness and skills, more families were involved at home (Hindman and Morrison, 2011). Further, when Head Start Centers invited families to specific activities and events, more families become involved at school (Hindman and Morrison, 2011). Another study with bilingual teachers increased the involvement of Spanish-speaking Mexican-American families from the time their children were in kindergarten to grade 3 through personal outreach (Tang et al., 2012). Additionally, the students, who started with low literacy scores in kindergarten, improved their literacy scores in third grade.

Summary: School Outreach to Engage Families

Parents at all income levels and of all ethnic backgrounds conduct many good parenting practices with their children at home. Yet most say that they need more and better information about how to help their children at each school level in ways that produce real results for student learning and behavior. Those whose children face learning difficulties want and need even more assistance and would benefit from early and sustained guidance from teachers to help them meet their children's needs. The studies reviewed in this section confirm that when educators meet and talk with parents about their children and offer guidelines, information, workshops, and specific activities to help families become active partners in their children's education, more parents respond as guided to contribute to their children's success in school, starting at the preschool level.

The study by Lynch (2010) suggests that teachers' beliefs may influence their actions with certain groups of families. Many teachers — especially young teachers who are more affluent and more educated than the families of the children they teach — may enter the profession with strong stereotypes that poor families and those with less formal education do not value education or care about their students' success. Teachers' skeptical or stereotypic views, however, are not supported by studies of parents conducted over the past 30 years. Professional development in preservice and inservice settings, therefore, will be needed to help all teachers recognize families' strengths and learn how to communicate with families in ways that support student success in school (Dauber and Epstein, 1993; Epstein, 1995; Hoover-Dempsey and Sandler, 1997). As noted by one teacher (Lynch, 2010, p. 163), "I think that if we give parents the proper set of tools — good, useful tools — they [the parents] can make an incredible difference."

There were clear and consistent findings of the value of "transitioning" activities to help students and families adjust as they move from preschool settings to kindergarten in elementary schools. Schulting and colleagues (2005) reported that families with low incomes typically experienced fewer transition practices than did economically advantaged families. Yet, when transition practices were implemented with underserved families and students, more parents were engaged and more students improved their literacy skills. Teachers who had professional development about transition activities implemented more such practices before the start of the school year (Early et al., 2001), with an eye to preparing parents and students to know that their classes welcomed the newcomers.

The studies point to the need for professional development, technical assistance, and support for all teachers about effective transition activities as well as systematic preparations by preschools and their "receiving" elementary schools. There are practical approaches that seem to work well. For example, a team of teachers, parents, and others may work together in the spring and summer before the transition to design and implement activities that will help the

“rising kindergartners” and their families feel welcome at the new school and to set the stage for parents to remain active partners in their children’s education. New studies should focus on the long-term results of effective designs of transition activities for parents and for students — particularly, students who are at risk of reading lags, parents with less formal education, and those who speak languages other than English at home. Research also would be useful on the “scale-ability” of alternative designs for transition activities for use by “feeder” preschools and “receiver” elementary schools, so that all young children would be guided to adjust and succeed in their new schools.

Composite Measures of Family Involvement

Nine studies used composite or general measures that included attention to family involvement activities at home *and* at school. These studies measured parents’ practices and attitudes about education that aimed to encourage children’s learning at home and/or at school. Three of the studies focused on preschool students; four studies involved kindergarten students; and two studies were meta-analyses of other interventions for families of children in kindergarten or first grade and above.

The general measures in these studies were called “parent involvement at home and at school”; “family context” (which included the home literacy environment, parent involvement in school, and parental role strain); “greater family involvement” (which included communications with the teacher, volunteering at school, expectations about learning, care about education); and “concerted cultivation” (which referred to the number of the child’s extracurricular activities, parent involvement with school, and number of children’s books in the home). Across these studies, seven reported positive effects of the general measure on student achievement or behavior, and three reported null results for students.

Research Findings: Composite Measures of Family Involvement

Meta-Analysis

Fan and Chen (2001) conducted a meta-analysis of 25 studies, mostly nonintervention studies, and concluded that parental involvement had small-to-moderate positive effects on reading. They reported average correlations between family involvement and overall student achievement and a weaker, positive relationship between family involvement and reading, specifically. The composite measures of involvement included parents’ educational expectations for children, communication with children about school-related matters, parental supervision or home structure related to school matters, parental participation at school, and a mix of other general involvement activities. The authors also explored separate dimensions of involvement and found that parents’ aspirations for their children’s education had the strongest relationship

with student achievement and that parents' supervision at home (for example, rules at home for watching TV, doing schoolwork) had the weakest relationship with student achievement.

By contrast, other authors reviewed 41 studies, mostly interventions, of parental involvement programs in kindergarten through twelfth grade (Mattingly, Prislín, McKenzie, Rodriguez, and Kayzar, 2002). The programs in the studies varied greatly, with an average of 3.4 intervention components; most programs included learning at home activities (79 percent) and/or supportive parenting (60 percent). The authors concluded that the general measure of parent involvement was not strongly linked to students' overall achievement. The authors' tables, however, indicated that most of the studies that they reviewed focusing explicitly on parental involvement with children on reading reported positive results on students' literacy learning (Sheldon and Epstein, 2005b).

These two meta-analyses convey mixed messages about the effects of composite measures of parental involvement on students' general achievement. When the composite measures were separated into specific types of involvement or were grouped so that the intervention's focus (for example, family involvement with reading) was linked to corresponding reading goals for students, there were positive effects of family involvement on the intended student outcome (such as reading skills).

Nonintervention Studies at the Preschool Level

Three studies investigated the effects of composite measures of family involvement and reported mixed results for students. Arnold, Zeljo, and Doctoroff (2008) found that greater family involvement (that is, communication with teacher, volunteering, expectations about learning, care of education) was associated positively with preschoolers' literacy skills and remained significant after controlling for parents' socioeconomic status (SES). By contrast, there were no significant results of a composite measure of parents' involvement on kindergarteners' social skills, problem behavior, or student-teacher relationships (Wildenger and McIntyre, 2012). This study did not include a measure of student achievement.

Box 2.7 features a study that used a composite measure of family involvement and preschoolers' academic and social-emotional development through fifth grade and points to some problems in linking a general measure of involvement with specific student outcomes.

Nonintervention Studies at the Kindergarten Level

Four studies used the ECLS-K data set to examine composite measures of family involvement. All four reported positive associations of family involvement with children's literacy skills, including across different socioeconomic and ethnic subgroups of students.

Box 2.7

Feature Study: Composite Measure of Parental Involvement and Children's Achievement and Social-Emotional Skills

El Nokali, Bachman, and Votruba-Drzal (2010) examined the association between a composite measure of family involvement and preschoolers' academic and social-emotional development in a sample of 1,364 children across first, third, and fifth grades. The composite measure included items on parents' attitudes about education, volunteering or visiting the school, and perceived correspondence of family and school goals for students. Students' cognitive skills were measured with the Woodcock-Johnson Psycho-Educational Battery-Revised, and socio-emotional development was measured by the Child Behavior Checklist. There were positive results of family involvement on students' social skills and behaviors but no significant connections with the cognitive measure.

The authors of the feature study discussed the problem of linking a general measure of involvement with specific student outcomes. This point also has been made by other researchers, who recommend that theoretically linked, subject-specific involvement measures should be used for the strongest and clearest effects on subject-specific outcomes for students (Sheldon and Epstein, 2005b; Van Voorhis, 2003, 2011). Although composite measures may be used to generate clues about the effects of involvement on student learning or behavior, they often mix "apples and oranges" in data and cannot be interpreted with confidence unless the component concepts are separated for analysis.

Cheadle (2008) conducted an analysis of how "concerted cultivation" (that is, measures of parent involvement with school, number of books at home, and extent of children's extracurricular activities) affected students' reading and math achievement. Results indicated that higher levels of the composite measure of family involvement related to children's reading skills in kindergarten and growth in reading during the school year, though not over the summer. The composite measure partially explained reading score differences attributable to SES and strongly related to black-white and Hispanic-white achievement gaps, controlling for SES.

In a related study, Raver and colleagues (2007) studied how a composite measure of parents' educational investments mediated the connections of family income with students' academic and social outcomes. Higher levels of parents' investments in education reduced the effects of family income on student outcomes, particularly for African-American and Hispanic students. Thus, even in relatively poor households, attention to educational goals, enriched learning opportunities, and parents' engagement at home and at school increased students' success in school. These results are reinforced by Durand (2011), whose study reported that a

general measure of involvement at home and at school was positively associated with Latino children's literacy skills.

Another study examined whether a general measure of family involvement and school and neighborhood factors affected children's reading trajectories (Aikens and Barbarin, 2008). The study showed that the family context (that is, resources, experiences, and relationships) was associated with initial reading gaps between groups of students in kindergarten. The connection of SES with children's reading competency was mediated by the composite that included home literacy environment, number of children's books at home, parental involvement at school, low parental role strain, and center-based care prior to kindergarten. Students' acquisition of reading skills — especially during the spring of kindergarten and spring of first grade — also was strongly associated with school and neighborhood conditions. Because the composite measure of family involvement cannot be separated, one cannot distinguish among the effects of the home environment, school programs, and community characteristics on reading achievement in the early grades. The general results are not very informative, leaving the details for future longitudinal studies with distinct family context measures.

Summary: Results of Composite Measures of Family Involvement for Student Achievement and Social-Emotional Skills

The studies reviewed in this section presented a mix of many positive and a few null connections of family involvement with students' cognitive and social-emotional outcomes. The various analyses of ECLS-K data produced mainly positive results of general measures of parents' investments and involvement on students' reading scores, including some attention to socioeconomic, racial, and ethnic subgroups of students. On average, children in economically strapped homes have fewer literacy-linked materials, resources, and experiences and enter school lagging behind economically advantaged students.

Schools may be able to help students close achievement gaps if they implement activities that strengthen parents' beliefs about the importance of literacy; increase parental home literacy activities; provide information on reading, writing, and literacy skills to families; enlist volunteers to work with groups of student at risk on a sustained basis; and reward students' progress in literacy achievement.

Supportive Parenting Practices

“Supportive parenting practices” refers to activities that parents conduct to support their children's development and well-being. This includes the nature and quality of the parent-child relationship and parenting activities, such as setting rules at home. Supportive parenting also includes caring behaviors that characterize the home environment, in general. This is in contrast

to parents' conducting specific literacy learning activities at home, which is addressed in the section above.

In this review, 12 of 15 studies that measured supportive parenting practices reported positive results for students' achievement and social-emotional skills. Three studies reported null results — neither positive nor negative — of parenting practices on achievement. Varying topics within supportive parenting practices are discussed, including the quality of parent-child interactions, parental beliefs, and the role of fathers. The following sections summarize important findings, highlight feature studies, and discuss implications for future research on supportive parenting and for improving practice.

Description of Studies of Supportive Parenting Practices

Fifteen of the 52 studies summarized in this review measured parenting practices; of these, nine were at the preschool level, five focused on kindergarten, and one involved parents of elementary students in grades 1 through 4. Three of the preschool and kindergarten studies followed students into elementary school (Hart and Risley, 2003; Englund et al., 2004) and high school (Gregory and Rimm-Kaufman, 2008). Ten of the studies included multiple measures of both supportive parenting and learning activities at home, and they reported the effects of these different emphases. Among the studies were two interventions: Getting Ready (Sheridan, Knoche, Kuyzyk, Pope Edwards, and Marvin, 2011), at the preschool level, and an intervention that was designed to help parents involve their children in daily family routines that contribute to children's learning in school (Powell and Peet, 2008).

The studies of supportive parenting practices included large and small samples and employed varied methodologies. Two studies were based on the Early Head Start Research and Evaluation project (Chazan-Cohen et al., 2012; Mistry et al., 2010). Smaller studies at the preschool level included one study of 229 preschool children (Hindman and Morrison, 2012); one study of 290 preschool children, with most mothers receiving government assistance (Tamis-LeMonda et al., 2004); one study of 42 preschool children through third grade (Hart and Risley, 2003); one study of 187 low-income preschool children through third grade (Englund et al., 2004); and one study of 92 preschool children (Cottone, 2012).

Five other studies related to kindergarten students, including three based on the ECLS-K data (Crosnoe and Cooper, 2010; Galindo and Sheldon, 2012; Raver et al., 2007), one study of 223 kindergarten students in an NICHD sample (Rimm-Kaufman et al., 2003), and one study of 142 kindergarten students following effects on their success in school through high school (Gregory and Rimm-Kaufman, 2008).

Research Findings: Supportive Parenting Practices

Interventions

Of two interventions to guide parenting practices, one focused on the preschool level (Sheridan et al., 2011) and one on the primary grades (Powell and Peet, 2008). Both reported positive effects of the intervention on students' cognitive or behavioral outcomes. Researchers reporting effect sizes found significant and large effects on preschool children's language use ($d = 1.11$) (Sheridan et al., 2011) and on children's involvement in daily family routines, child-parent conversations, and teachers' ratings of the family's influence on the child's school performance (Powell and Peet, 2008).

Box 2.8 features the preschool intervention to illustrate key findings across studies of supportive parenting practices.

Nonintervention Studies

Nine nonintervention studies of supportive parenting explored the warmth or quality of parenting interactions, the nature of beliefs about parenting, and effects of fathers' and mothers' supportive parenting practices on student development. This section summarizes three studies of the warmth of interactions, one study of parents' attitudes and beliefs, and one study of fathers' parenting practices.

Quality of Parenting Interactions. Hart and Risley (2003) studied the conversations of 42 families with low and high incomes and reported significant differences in the number of encouraging versus discouraging statements by parents of preschool children. In families with high incomes (professional occupations), the ratio of encouraging to discouraging words was 6:1, compared with the ratio of 2:1 for families with low incomes (working class occupations) and with a reversed ratio pattern of 1:2 for families on welfare. The study confirmed earlier work showing that, on average, more words per hour (wph) were spoken and exchanged in families with high income (2153 wph) than in families with low income (1,251 wph) and in families on welfare (616 wph). There are serious implications of these factors for students' language skills over time, as the early home language experiences of children at age 3 was positively correlated with receptive vocabulary scores (PPVT-R) in third grade, language scores (Test of Language Development 2; TOLD), and reading comprehension (Comprehensive Test of Basic Skills) in elementary school.

Another study involved a group of 187 preschool children in families with low income and examined the relation between the quality of mother-child interactions and children's outcomes (Englund et al., 2004). The quality of mother-child interactions was assessed during a

Box 2.8

Feature Study: Intervention on Supportive Parenting and Achievement Outcomes

The Getting Ready intervention's well-designed structure for home visits promoted more positive parenting and better results for preschool students. Sheridan and colleagues (2011) conducted a randomized study of the Getting Ready intervention with parents of 217 Head Start children to examine its impact on preschool students' language, reading, and writing skills. The overarching goal of the intervention was to increase positive parenting behaviors and to improve preschool students' literacy readiness skills and prospects for success in school. The intervention treatment group of families received an average of 8.35 home visits, each about one hour, over two years, whereas the control group families conducted parenting as usual.

At the home visits, Head Start teachers helped parents to conduct learning activities in daily routines and to learn strategies that increase positive parent-child interactions, parental warmth and sensitivity to children's needs, and support for children's autonomy and self-directed activities. Professionals introduced the theme or goal for the meeting, encouraged conversations and questions that arose since the previous visit, observed parent-child interactions, provided information, modeled positive strategies, affirmed the parent's competence, summarized the visit, planned the next visit, and identified learning opportunities for the parent to conduct with the child in the upcoming week.

Using measures from the Teacher Rating of Oral Language and Literacy (TROLL) and Preschool Language Scale-4th Edition, the researchers found significant and large differences favoring students in the treatment group over control group students on teachers' reports of stronger language use ($d = 1.11$), reading ($d = 1.25$), and writing ($d = 0.93$). There were no differences between groups on an observational measure of students' expressive communication. Changes or growth rates for students were positively affected by the intervention but were unrelated to child gender, parent education, and primary language at home. The intervention had stronger, compensatory effects for students who started with developmental delays and who spoke languages other than English at home.

videotaped laboratory procedure involving a set of four developmentally appropriate problem-solving situations; quality ratings were based on mothers' instructional behavior (how well she structured the situation and coordinated her behavior to the child's activity and needs for assistance), with higher ratings indicating more effective instruction. The quality of mother-child interactions at 42 months had significant direct effects on children's IQ and achievement

in grade 1 and had indirect effects on achievement in grade 3, with the mediating variables of achievement in grade 1 and parents' expectations in grades 1 and 3. These results were reinforced by a study that followed 142 kindergarten children into high school (Gregory and Rimm-Kaufman, 2008). Using logistic regression analyses to identify probabilities, the researchers found that students were 3.5 times more likely to graduate from high school for every one unit higher of mother-child positive parenting interaction scores collected in kindergarten. The quality of parenting was the most predictive of high school graduation of all variables measured in the study, including maternal education, race, gender, and IQ.

The three studies discussed above combine to show the powerful and predictive roles of early positive mother-child interactions for later elementary and high school student achievement.

Parental Beliefs. Two dimensions of parenting — observed maternal sensitivity and teachers' reports about parental beliefs or attitudes about school — were examined in a study of students' achievements and social behaviors in kindergarten (Rimm-Kaufman et al., 2003). Using the Teacher-Child Rating Scale, the ECLS-Academic Competence Rating Scale, and the Sociometric Status Scale, the researchers found that maternal sensitivity (observed using a toy play task when children were 3 years old) was positively associated with teachers' ratings of kindergarten students' language and math outcomes, student competence, and being well liked by peers and, conversely, were negatively linked to behavior problems and being disliked by peers. "Family attitudes about school," which was measured in kindergarten, was positively associated with eight of the nine measured outcomes of student achievement and behavior (except for observed student self-reliance). The study revealed that early parent-child interactions and parents' concurrent attitudes about school when the child was in kindergarten were important aspects of parenting for student success in school.

Father's Roles in Parenting. A study of 290 children ages 2 to 3 in families with low incomes examined the relative impact of the mother's and the father's supportive parenting practices on their preschool child's achievement (Tamis-LeMonda et al., 2004). The researchers reported that each parent's parenting activities significantly, separately, and positively predicted results for students. In regression analyses that included other important covariates (including mother's and father's level of education and father's income), mother's and father's supportive parenting practices significantly (or nearly significantly) predicted the scores of 2-year-old children on the MDI and PPVT and the scores of 3-year-olds on these same measures. For example, children's mental acuity, memory, verbal and math concepts, and skills measured by the MDI were associated with father's supportive parenting, mother's supportive parenting, and father's education. Together, these variables explained 28 percent of variance in MDI scores.

Box 2.9 features a study showing that the parents' initial behaviors as well as the rate of change in positive or negative directions may affect students' achievement and behavioral outcomes over time.

Box 2.9

Feature Study: Change in Supportive Parenting and Results for Children's Achievement and Social-Economical Skills

Although it is clear that parenting is not a static skill, few studies have simultaneously examined the impact of the quality of parenting at *one* point in time and the effects of changes *over time* on students' outcomes. A study by Chazan-Cohen and colleagues (2012) measured the quality of early parenting and the effects of *improvements* in quality over time on child cognitive outcomes and behavior. In this study, 1,273 Early Head Start children and their families participated when the children were 1, 2, 3, and 5 years of age. The authors measured parents' depressive symptoms, parenting stress, the home learning environment, and supportive parenting when children were between the ages of 14 months and 5 years old, to calculate the change and slope of these indicators.

Supportive parenting — which formed a constellation of positive behaviors with parental sensitivity and cognitive stimulation at home — was positively associated in multivariate linear regression analyses with measures of students' emotion regulation, vocabulary measured by the Peabody Picture Vocabulary Test — PPVT-III, and the Woodcock-Johnson Letter-Word Identification Scale. Positive *change* in supportive parenting was significantly associated with children's emotion regulation and vocabulary. Both the parents' initial behaviors and the rate of change in positive or negative directions, then, may affect students' achievement and behavioral outcomes over time.

Summary: Results of Supportive Parenting on Children's Achievement and Social-Emotional Skills

Of the 15 parenting studies reviewed (including three interventions), 13 reported positive results for students' learning, and three reported null or no significant results. Positive parenting effects on achievement-related outcomes included:

- Preschool vocabulary (Chazan-Cohen et al., 2012; Tamis-Lemonda et al., 2004)
- Preschool letter-word identification (Chazan-Cohen et al., 2012)

- Preschool Bayley Mental Development Index (MDI) scores (Tamis-Lemonda et al., 2004)
- Preschool language use, reading and writing (Sheridan et al., 2011)
- Preschool, kindergarten, first-grade, third-grade, and high school reading achievement (Crosnoe and Cooper, 2010; Englund et al., 2004; Galindo and Sheldon, 2012; Gregory and Rimm-Kaufman, 2008; McWayne et al., 2004; Mistry et al., 2010; Raver et al., 2007; Rimm-Kaufman et al., 2003)
- Third-grade Test of Language Development 2 (TOLD) (Hart and Risley, 2003)
- Higher graduation rates (Gregory and Rimm-Kaufman, 2008)

Null Findings

Three studies reported null effects of particular aspects of supportive parenting on student outcomes:

- Supportive parenting was unassociated with students' Woodcock-Johnson Letter-Word Identification scores (Chazan-Cohen et al., 2012).
- Autonomy support and management of discipline was unrelated to students' literacy skills (such as alphabet knowledge, decoding, and vocabulary) (Hindman and Morrison, 2012).
- Mothers' reading beliefs were unrelated to children's phonological awareness (Cottone, 2012).

Social-Emotional Findings

Eight studies that are reviewed in this section reported positive associations of positive parenting practices and students' social-emotional outcomes. There were no studies with null or negative results. These studies found:

- More positive preschool and kindergarten emotion regulation (for example, sharing, developing confidence, behaving appropriately in different contexts, and other self-regulated social behaviors) (Chazan-Cohen et al., 2012; Hindman and Morrison, 2012; McWayne et al., 2004; Mistry et al., 2010; Raver et al., 2007)

- Reduced preschool and kindergarten child behavior problems (Mistry et al., 2010; Rimm-Kaufman et al., 2003)
- Increased cooperation in preschool (Hindman and Morrison, 2012)
- Greater likelihood of a kindergarten child being liked by peers (Rimm-Kaufman et al., 2003)
- More conversations between parents and elementary children and involvement of children in adult daily routines (Powell and Peet, 2008)

Like the studies of parental involvement with children on learning activities at home, the studies of parenting practices, overwhelmingly, reported positive cognitive and social-emotional results for children. Recent investigations, such as the study by Chazan-Cohen and colleagues (2012), included several measures of parenting, not just one practice. Multidimensional concepts of parenting enrich our understanding inasmuch as — depending on the methods of analyses — composite measures may instantly confirm or contradict each other and may encourage discussions of nuances of results. Using different methods and models, the studies agreed that early warm and sensitive parent-child relationships positively affected children in preschool and that these effects may be sustained through high school (Gregory and Rimm-Kaufman, 2008).

One recent study reviewed here extended our understanding by addressing *changes* in parenting support and attitudes over time (Chazan-Cohen et al., 2012; see Box 2.9). By measuring whether the quality of parenting changed as students proceeded through school, the research improved understanding of the kinds of practices that help parents guide their children effectively from preschool through high school.

Next Steps

More research on fathers' roles in parenting and in children's education at home and at school is needed to balance the overwhelming attention to mothers in past studies. A few studies of supportive parenting included separate measures of mothers' and fathers' parenting actions and found that they were independently and positively associated with preschool children's outcomes (Leavell, Tamis-LeMonda, Ruble, Zosuls, and Cabrera, 2012; Rimm-Kaufman and Zhang, 2005; Tamis-LeMonda et al., 2004). More comparative research of mothers and fathers would improve our understanding of whether, when, and how they are similarly or differently involved and influential in their children's education and school attitudes. Further, studies could examine whether maternal and paternal involvement and its influence on child outcomes differs by gender, grade level, race/ethnicity, and other measures of family background. A deeper

repertory of such studies would guide educators to broaden practices to engage fathers at school and at home in their children's education.

Even as the research agenda grows, enough is known to suggest that teachers (and others outside the school who are in regular contact with families) could conduct activities to increase the number of parents who are confident about their parenting skills and support for children's reading development. This will require teachers, administrators, and parent leaders to reach out to involve more and different families in workshops and training activities on positive parenting beliefs, skills, and behaviors using new technologies. In the studies summarized in this section and many prior studies, parents' beliefs about parenting and about education affected whether and how they interacted with their children in reading and how they influenced their children's attitudes, work, and progress in school (Hoover-Dempsey and Sandler, 1997). This finding, confirmed across studies, should persuade early childhood educators to reach out to all parents to strengthen their beliefs about their influence on children's learning and success in school. Although new research will continue to strengthen the knowledge base, it is possible to use the extant research to develop concrete, feasible, and "fun" activities that, when conducted, will enable all parents to have interactions that share the joy of thinking and learning with their children.

Summary and Reflections: Family Involvement with Children on Reading and Literacy Activities

Chapter 2 reviews results of 52 research investigations of the links of family involvement at home and at school with students' literacy learning and social-emotional skills. The intervention and nonintervention studies overwhelmingly agree that learning activities at home, supportive parenting, and other involvement activities conducted at school and at home are positively associated with students' reading and literacy achievement and social-emotional outcomes. Although most studies measured students' cognitive skills, several studies explored changes in parents' involvement, students' behavior, and students' emotions or attitudes. Only a few studies reported null associations of family involvement and student literacy learning.

The intervention studies provide the most credible results. They strongly suggest that students benefit most when parents, teachers, and students conduct shared reading and other enjoyable literacy-linked activities with confidence and with pleasure at home or at school. The studies of family involvement with children on literacy learning have implications for research and for practice. New research should:

- Better understand communications between families and schools about literacy.

- Explore and compare fathers' and mothers' involvement with students on literacy learning.
- Conduct more goal-linked studies of family involvement with subject-specific measures and outcomes.

Most studies reviewed here confirm that children had higher reading skills and greater growth in reading and literacy competencies if they had more opportunities to practice reading through shared storybooks, interacted with parents in conversations and other literacy-linked activities at home, got help as needed from school volunteers, and interacted with caring and highly competent teachers from preschool on.

The strong agreement across studies should encourage educators to engage all parents in productive and enjoyable literacy-related activities with their children at home and at school and to ensure that all children master reading readiness skills for a successful transition to kindergarten. However, confirmed results across studies have not translated into clear “how to” guidelines for all educators of students in diverse family, school, and community contexts. Because of this, school practices lag behind the formidable research base summarized in this report. However, research results should inform practice. Based on the studies reviewed here and many prior studies, it is possible to:

- Provide more and better information to families to strengthen literacy learning activities that can be conducted at home by all parents with their young children
- Expand family knowledge of literacy-linked activities in a family-friendly way, particularly for families whose first language is not English
- Offer early and sustained interventions to engage families in literacy learning activities with students who are most at risk of lags in reading readiness or school failure
- Encourage parents' to understand and communicate their beliefs about the importance of literacy and learning to their children
- Urge educators and parents in preschools and kindergartens to work together to plan and implement effective transition programs to help students and their families prepare for and adjust to their new schools

There is also a real need to develop and to study more high-quality and research-based professional development materials, workshops, and courses to expand early educators' knowledge of effective practices that will enable them to:

- Guide parents' on learning activities at home
- Organize successful programs for volunteers to help children with reading readiness and related literacy skills at school
- Construct responsive transition programs and activities to prepare students and their families for their new school
- Conduct positive communications with parents on reading readiness, math readiness, social readiness, and other age-appropriate skills that are linked to student success in preschool and kindergarten

Over many years, the researchers conducted and reported on their studies, which included many examples of effective interventions and collaborations of teachers and parents. Yet the tested connections, communications, and activities that linked consistently to student success have not been translated into easy-to-use materials for general teaching practices. In too many preschools and elementary schools, teachers and parents remain unconnected, with each group trying to help the children in its own way. Moving forward, it should be possible to continue to strengthen the research agenda, improve professional development, and enable educators to use the results of research in practice to engage more and different families and to benefit more children in preschool and beyond.

Chapter 3

Family Involvement in Math Activities and Results for Children's Math Achievement and Social-Emotional Skills

Chapter 3 summarizes research regarding family engagement with young children on mathematics activities. Because fewer studies have been conducted on family involvement in numeracy readiness or early mathematics learning than on family involvement in literacy activities, this chapter on math expands the review criteria to comprehensively cover the research base. Criteria for inclusion were extended to include studies published since 1992, with children beyond grade 3, and with smaller samples (that is, fewer than 40 children or 40 parent-child dyads). Thus, the 43 studies reviewed were published between 1992 and 2012, most (84 percent, or 36 studies) in 2001 or later. Ten international studies (23 percent) found on this topic were conducted outside the United States and will be reviewed separately.

Of the 43 articles on family involvement in math, 33 percent (14 studies) focused on preschool children; 35 percent (15 studies) included kindergarten children; 9 percent (4 studies) reported on children in grades 1 through 3; and the remaining 19 percent (8 studies) reported on children in fourth grade and beyond. Two articles were meta-analyses of varied studies. (See Table 1 in Chapter 1 and Appendix Table A.2 for, respectively, general characteristics of and specific details about the studies.)

The studies ranged in sample size. Just over one-fourth of the studies (28 percent, or 12 studies) had samples of 1,000 or more; 23 percent (10) had samples of 101 to 550 children; 23 percent (10) included samples of 41 to 100; and 14 percent (6) reported on samples of 40 or fewer children. Three studies reported their sample sizes by the number of schools investigated rather than by the number of participating children; they reported having 1, 18, and 39 schools. The two meta-analyses reviewed, respectively, 15 intervention studies and 25 intervention and nonintervention studies with varied sample sizes. Because of the limited number of studies of family involvement in math with students in the early grades, a few informative studies were included that had small sample sizes.

The studies of family involvement with children in math varied in design and in methods of analysis. About one-fourth, (23 percent, or 10 studies) were based on interventions to increase family involvement in math, but only 7 of them met criteria and are reported in this chapter. Others (31) were nonintervention studies that used correlational designs to examine the links between family involvement in math and children's math skills. Over half (51 percent, or 23 studies) reported longitudinal data. The majority of these (61 percent, or 14

studies) examined data over a single school year. Others (35 percent, or 8 studies) followed children across multiple school years, typically from the preschool into elementary school. One intervention study lasted only two weeks but reported on children’s math skills before and after the intervention.

Several of the longitudinal studies analyzed large data sets, such as the National Longitudinal Survey of Youth-NLSY (Crane, 1996; Zhan, 2006); National Institute of Child Health and Human Development (NICHD) Study of Early Child Care and Youth Development-SECCYD (El Nokali, Bachman, and Votruba-Drzal, 2010); National Education Longitudinal Study of 1988-NELS:88 (Catsambis and Beveridge, 2001; Haghghat, 2005; Holt and Campbell, 2004); Early Childhood Longitudinal Study-Kindergarten Cohort-ECLS-K (Galindo and Sheldon, 2012; Greenman, Bodovski, and Reed, 2011; Schulting, Malone, and Dodge, 2005); and Childhood and Beyond-CAB (Jacobs and Bleeker, 2004). These large data sets provided researchers with general or composite measures of family involvement at school — not family involvement at school or at home with children specifically in math. The one exception was CAB (Jacobs and Bleeker, 2004), which included parents’ reports of their involvement with math and science activities at home.

Among the studies reviewed, 28 percent (12 studies) employed multilevel analysis techniques, whereas others (40 percent, or 17 studies) used regression analyses or path models. Another 28 percent (12 studies) used t-tests or analysis of variance/analysis of covariance (ANOVA/ANCOVA), chi-square tests, or other analyses to report findings. The two meta-analyses examined and summarized effect sizes.

Taken together, the studies — with their varied designs, samples, and methods — provided the most recent and most comprehensive results available on patterns of family involvement in math in the early grades and their influence on children’s math achievement. Appendix Table A.2 summarizes each of the 43 studies on math-linked family involvement and gives information on the form of parental involvement, study citation, age of children, study design and sample characteristics, results for and measures of children’s math and social-emotional skills, and other results of interest.

The following pages in Chapter 3 focus on four categories of family involvement and their relations with children’s math learning: *learning activities at home*, *family involvement at school*, *school outreach to engage families*, and *supportive parenting*. They summarize the research findings in each of the four family involvement categories, highlight “feature” studies that present important findings and summarize research on a topic, and discuss implications for future research and practice.

Family Involvement in Children’s Math Learning Activities at Home

Studies examining family involvement in math learning activities at home and its effects on children’s math achievement had two main foci: (1) those that specifically promoted *math* learning at home and (2) those that promoted students’ learning or achievement more generally (for example, *math and literacy*). Most of these studies were correlational in nature, although four studies used randomized designs to implement interventions that engaged parents of preschool-age children in math activities at home; one of these also engaged parents in literacy activities at home. The next several sections report on intervention and nonintervention study findings on family involvement in both math and learning at home.

Research Findings: Family Involvement in Math Learning at Home

Intervention Studies

Three early childhood interventions explored whether and how specific guidelines for parents to engage in math activities with their young children at home affected students’ math readiness skills. In one intervention, parents with low socioeconomic status (SES) whose children were enrolled in Head Start participated in the *Family Mathematics Curriculum*, which consisted of a series of meetings about math content and activities conducted over half a school year (Starkey and Klein, 2000). The intervention was tested in two randomized studies of, respectively, predominantly African-American families (28 mother-child dyads) and predominantly Latino families (31 mother-child dyads). In both studies, the researchers controlled for pretest math scores and found that the intervention had positive effects on preschool children’s posttest scores of informal mathematics knowledge (that is, math skills on researcher-created numerical and spatial/geometric tasks).

The other two intervention studies engaged middle-to-high-income parents with their preschoolers on everyday math activities at home in two short-term interventions: one day (Vandermaas-Peeler, Boomgarden, Finn, and Pittard, 2012) or two weeks (Vandermaas-Peeler, Ferretti, and Loving, 2011). In the two-week intervention group, parents were given suggestions and directions for conducting numeracy activities while playing a board game with their child (Vandermaas-Peeler et al., 2011). In the daylong intervention group, parents were given suggestions and directions for incorporating numeracy activities when cooking with their child (Vandermaas-Peeler et al., 2012). Suggestions were provided to parents by the researchers in a list or on recipe cards, respectively. Parent-child dyads were randomly assigned to the intervention (the “numeracy awareness group”) or to the comparison group that conducted normal activities at home without receiving explicit suggestions about math. As observed and coded by the researchers, children in the numeracy awareness groups

generated more correct math responses to their parent's questions than did children in the comparison groups. However, there were no significant differences in math scores of the intervention and control groups of students on directly assessed math posttests (Test of Early Mathematics Ability-3rd Edition [TEMA-3] in the 2011 study and a researcher-created measure based on the TEMA-3 in the 2012 study). It is important to note that the two interventions involved relatively small samples: 29 and 25 parent-child dyads, respectively (Vandermaas-Peeler et al., 2011; Vandermaas-Peeler et al., 2012).

These three randomized intervention studies showed that parents at varied income levels could use information provided in an intervention to become engaged with their children in math activities at home. The parents' involvement in children's math learning had mixed results across studies, however. In the Head Start sample, children whose families were in the *Family Mathematics Curriculum* intervention group improved tested math skills (on researcher-created math measures) compared with children in the control group. By contrast, children in families with higher incomes in the short-term everyday interventions did not differ on measured math skills (TEMA-3 or researcher-created math measure) from those in the control groups.

These results could be due to differences between the interventions in their duration, content, and targeted population. The numeracy awareness interventions lasted for a short time, whereas the Family Mathematics Curriculum was a semester-long intervention. It may be, for example, that enhancing parent interactions with children on numeracy in typical home activities like cooking and board games *over a longer time period* would yield positive effects on children's tested math skills.

Further, the numeracy awareness intervention was tested in parent-child dyads from middle-to-high-income homes, whereas the Family Mathematics Curriculum was tested in families from low-income homes. Given that children from economically disadvantaged homes tend to begin preschool with lower math skills and fewer math experiences at home than children from high-income homes, interventions that guide parents' involvement in math may be more useful and more effective for children and parents from low-income households. (Box 3.1 features the study of the Family Mathematics Curriculum.)

Finally, the content of the interventions differed from a structured curriculum to a few suggested impromptu math activities at home, where other learning may be happening. It may be that parents are more likely to participate regularly and faithfully with their children on activities that are guided in specific rather than in general or suggestive ways. By increasing parents' understanding of and comfort in conducting targeted, systematic, and enjoyable math-related learning activities at home, more preschool and early elementary students may be likely to improve their math competencies.

Box 3.1

Feature Study: Intervention to Increase Parent Involvement in Math Activities at Home

This study by Starkey and Klein (2000) of the Family Mathematics Curriculum is one of the few longer-term interventions for parents that focused on math and that has been tested in a randomized controlled trial using diverse families. The Family Mathematics Curriculum provides a structured mathematics course in which parents with low incomes and their preschool children attended family math classes and were given access to math materials to use at home. Eight classes were conducted every two weeks over four months by two trained teachers at Head Start Centers.

Two randomized studies examined the effects of the intervention on children's early mathematics and literacy scores. One study included predominantly African-American families (28 mother-child dyads), and the other included predominantly Latino families (31 mother-child dyads). The children in the intervention group in both studies had significantly higher posttest mathematics scores than did children in the comparison group. Additionally, the intervention was effective for preschoolers in both the lower and upper parts of the developmental range in mathematics. The Family Mathematics Curriculum did not produce any significant results on preschoolers' literacy skills. It is important to note that the authors reported that attrition reduced Study 1 by four families and Study 2 by one family.

Nonintervention Studies

Six nonintervention studies of family involvement with math-focused learning activities at home were reviewed. Four were cross-sectional, and three included child characteristics as covariates. Most reported positive associations between family involvement and children's math outcomes. For example, the frequency of mothers' involvement with their children in number learning was positively related to kindergarteners' performance on a math task, controlling for child age and individual test performance (Pan, Gauvain, Liu, and Cheng, 2006). A study with a sample of Chinese-American, Euro-American, and Taiwan-Chinese preschoolers and kindergarteners found a positive association between parents' math teaching at home and children's math scores, controlling for child age and ethnicity and for parents' math attitudes and beliefs (Huntsinger, Jose, Liaw, and Ching, 1997). Across all ethnicities, children had higher math scores if their parents reported using more formal and direct teaching, as well as focused practice activities, with their children, compared with children whose parents reported using more informal and spontaneous math practices. Similarly, in a study of European-American and Chinese-American children, parents who reported using more formal and direct methods to

teach their children math in preschool — in comparison with parents who used more informal, spontaneous, or play-oriented methods — tended to have children with better math test scores on a standardized math test in third and fourth grades (Huntsinger, Jose, Larson, Krieg, and Shaligram, 2000).

Another nonintervention study also produced important results that may guide future studies of more organized approaches to family involvement in math. Parents' reports of their children's common activities at home with arithmetic and with money were positively related to the children's scores on different mathematic tasks (researcher-created math problem tasks) in grades 1 through 3 (Guberman, 2004). When parents reported that they and their children frequently conducted instrumental activities using money at home, the children correctly solved more problems using money than did children whose parents reported fewer home activities with money. In contrast, children whose parents conducted more math activities with them at home that did *not* involve money solved more math problems using "chips" than did children whose parents reported fewer math activities that did not focus on money (Guberman, 2004). Not only did this study highlight a positive link of family involvement with math to children's math skills and test performance, but it also suggested that children's skill on different kinds of mathematics tasks may be linked to or depend on the kinds of math activities that are conducted or reinforced at home (Guberman, 2004).

Finally, another longitudinal, correlational study of children in first, second, and fourth grades also showed a positive relationship between math activities at home and children's math outcomes, controlling for children's gender and interest in math as well as parents' value of math and perception of their child's math ability (Jacobs and Bleeker, 2004). In this study, maternal reports of time spent modeling math and of math or science purchases and activities were positively related to both mothers' reports of children's later math involvement outside school and children's report of their interest in math (Jacobs and Bleeker, 2004).

Among the studies reviewed in this section, only one reported a nonsignificant correlation between parents' reports of the frequency of home mathematics activities and preschoolers' mathematics scores on the Test of Early Mathematics Ability-2 (TEMA-2; Blevins-Knabe, Austin, Musun, Eddy, and Jones, 2000). The authors noted that parents' reports of their attitudes toward and use of math-related activities suggest that math was not high on their priority list, compared with reading and social activities. They also suggested that parents may view math as less important, may enjoy math less, and may have less knowledge about math than other learning activities.

These five nonintervention studies included a variety of parent reports about the home environment as their measure of family involvement with children on math. The parent reports ranged from general measures of the frequency that different mathematics activities were

conducted at home to specific measures, such as whether children were involved in activities with and without money and whether parents' teaching practices were more formal and academic or more informal. Despite these differences, almost all findings identified a positive link between math-focused home learning involvement and children's math outcomes. Although none of these correlational studies used sophisticated statistical analyses, most accounted for child characteristics and, thus, provided evidence — albeit relatively weak — for the positive relation between family involvement with children on math activities at home and children's math outcomes. The studies are strengthened by the confirmation of findings across studies, but they still must be considered preliminary and in need of confirmation in studies that more objectively measure home-based interactions and behaviors.

Research Findings: Family Involvement in General Learning at Home

Intervention Study

One intervention study measured family support for and involvement in children's learning at home more generally (that is, math *and* reading) and effects of this involvement on preschool children's math-related outcomes. Focused on families and preschool children, the *Getting Ready for School (GRS) program* was a semester-long, curriculum-based intervention designed to support parents in increasing their preschool children's school readiness skills in math and reading (Noble, Duch, Darvique, Grundleger, Rodriguez, and Landers, 2012). A pilot study ($N = 56$) conducted in Head Start classrooms demonstrated that children who were randomized into GRS improved significantly more on their math scores (Woodcock-Johnson Applied Problems but not Quantitative Concepts) than did children in the comparison group. Additionally, parents in focus groups said they had positive reactions to the GRS program. They also reported seeing positive changes in their own abilities to teach and support their child as well as improvements in their child's skills and attitudes about learning.

It is interesting that this early childhood intervention that focused on helping parents engage with their children in math *and* literacy readiness had positive effects on children's math skills but not on their literacy skills (Woodcock-Johnson Letter-Word Identification, Passage Comprehension, Understanding Directions, and Picture Vocabulary). There could be many reasons for this that may be clarified if future studies follow the provocative pilot study. For example, it is generally accepted that parents tend to provide fewer math-related activities at home than literacy-related activities (Anders, Rossbach, Weinert, Ebert, Kuger, Lehl, and von Maurice, 2012). Thus, parents may have more room to grow in providing math support at home. The intervention likely provided parents and children in the intervention group with new ideas and strategies that were not part of the repertory of the parents and children in the control group and, therefore, would not have been previously conducted on their own at home.

Box 3.2 features the pilot study of the GRS program and its effects on preschoolers' math and reading readiness skills.

Box 3.2

Feature Study: Intervention to Increase Parent Involvement in General Learning Activities at Home

The intriguing findings of the pilot study for the Getting Ready for School (GRS) program (Noble et al., 2012) adds to the few longer-term interventions for parents that focused on math and that have been tested in a randomized controlled trial. The GRS program is a nine-unit curriculum designed to help parents promote preschool children's school readiness skills in math and reading. It included weekly, two-hour workshops for 15 weeks led by a trained facilitator. Parents used familiar items and everyday interactions in the home and community (for example, buttons, laundry, cooking) to prompt children's learning, including solving math problems, connecting math with real life, estimating numbers and sizes, and exploring shapes.

A pilot study in four Head Start classrooms with 56 parents of preschoolers demonstrated that the children of the intervention group improved significantly more than did the children of the comparison group on the Applied Problems subtest of Woodcock-Johnson III (for example, showing two fingers, counting objects, and adding or subtracting small numbers). There were no significant differences between the intervention and the comparison groups scores on the Quantitative Concepts (such as oral questions about mathematical factual information, number patterns) or on the Letter-Word Identification, Passage Comprehension, Understanding Directions, and Picture Vocabulary subtests.

Nonintervention Studies

Three correlational studies were found that examined composite measures of parents' support and conduct of various learning activities at home — including but not limited to math — and children's math outcomes. These studies examined data from parents and children at the preschool or kindergarten level but found no significant connections of the frequency of parent engagement with children in a variety of learning activities at home on children's math learning (Galindo and Sheldon, 2012; Powell, Son, File, and San Juan, 2010; Roopnarine, Krishnakumar, Metindogan, and Evans, 2006).

In one correlational study, neither mothers' nor fathers' reports of involvement with children in academic activities at home were related to kindergarteners' number skills (the Number Skills subtest of the Kaufman Survey of Early Academic and Language Skills), controlling for parenting style and parent's education (Roopnarine et al., 2006). This study did find, however, that fathers' reports of involvement with children in academic activities at home were positively associated with parents' reports of children's social behaviors. Two stronger studies using hierarchical linear modeling (HLM) and strong controls of child, family, and school factors reported related results (Galindo and Sheldon, 2012; Powell et al., 2010). Both Galindo and Sheldon (2012) and Powell and colleagues (2010) asked parents about the frequency of engaging in educational activities with their children, such as telling the child a story; teaching letters, words, or numbers; teaching songs or music; playing counting games; playing with blocks; playing with puzzles; playing with shapes; counting different things; and reading together. Neither study found a significant relationship between the composite measure of parent-reported involvement with their children at home and the preschoolers' mathematics scores (ECLS-K math; Woodcock-Johnson Applied Problems). Powell and colleagues found that parental home involvement was not predictive of children's social skills, either. Interestingly, in both studies, the researchers reported a significant, positive connection between parents' reports of their involvement at their children's *school* and children's mathematics scores. (See Box 3.3.)

In sum, relatively few focused, longitudinal, nonintervention studies have been conducted that examine parents' support for or interactions with children on *general* learning activities at home. The three studies that were found and included in this review — all of which had strong statistical controls in their analyses — reported nonsignificant associations with children's math outcomes. This is in contrast to the nonintervention studies discussed above that found positive links between parents' support for and interactions in *math* learning and children's math skills. This pattern of results may be due to the lack of specificity in these studies of the composite measures of home involvement in general learning activities. Future studies should systematically examine specific learning activities that parents conduct and discuss at home that are linked to specific academic subjects. In that way, new studies would be better able to identify *which* parental involvement activities at home are related to *which* academic outcomes for children.

Summary: Parent Involvement in Learning Activities at Home

The intervention and nonintervention studies reviewed in this section reported mainly positive results of parental involvement on learning activities at home with children's mathematics skills. In particular, two well-designed randomized interventions that used strong, curriculum-based approaches to increase parental involvement in young children's math

Box 3.3

Feature Study: Nonintervention Exploration of Composite Measures of Parental Involvement and Children's Learning and Behavior

In a study of the relations between parental involvement in learning activities at home, as well as at school, and children's math skills, Powell and colleagues (2010) used hierarchical linear modeling (HLM) and a strong set of covariates (that is, fall math scores, ethnic background, maternal education, parents' perception of teacher responsiveness to the parents and child, and observed quality of teacher interactions with children) in a relatively large sample of 140 four-year-olds.

Involvement in learning activities at home was measured by parents' reports of the frequency of engagement with their children in such activities as counting; telling or reading a story; teaching letters, words, and numbers; and playing with shapes. This composite measure, which mixed parent involvement in reading and math activities at home, was not significantly related to preschoolers' scores on the Applied Problems subscale of the Woodcock-Johnson III.

Involvement at school was a composite measure of parents' reports of the frequency of participation in such activities as attending a parent-teacher conference; volunteering in a classroom; helping with a field trip; attending school social events, workshops, or meetings; participating in fundraising; and calling another parent. Involvement at school was significantly related to children's school readiness skills. The authors reported moderate effect sizes of parent involvement at school with students' scores on the Applied Problems subscale ($d = 0.36$). Further, stronger parent-school relationships established by involvement at school also were related to children's higher social skills ($d = 0.55$) and fewer problem behaviors ($d = 0.47$), as measured by the Social Skills Rating System. (Effect sizes vary by context, but it is generally accepted that an effect size is large at 0.8 [that is, 8/10 of a standard deviation unit], moderate at 0.5, and small at 0.2; Cohen, 1988).

learning at home showed, convincingly, that parents — including those with low income whose children are in Head Start programs — were willing and able to support their children's math development in the home. The curriculum-based interventions (Noble et al., 2012; Starkey and Klein, 2000), which were comprehensive and long term, demonstrated positive effects on children's math skills. Two other studies of interventions that offered suggestions to parents (but not explicit training) to encourage parent-child interactions on naturally occurring, everyday math-related activities did not find significant effects on children's assessed math learning.

However, these two studies did find positive effects on children's observed responses to parents' math questions during the activities.

The pattern of results gives good information that a randomized design, specific math content, and clear activities are important in an intervention for improving and increasing parents' interactions with children on math activities at home. Further, the findings suggest that interventions that include workshops or training for parents — for example, meetings in which they are provided with examples of math activities — conducted over several weeks may be more effective than short-term interventions that merely provide suggestions for math activities in the moment. Such preparation for and with parents may help them feel confident, positive, and more knowledgeable about interacting with their children about math. Poor or weak designs may sustain common math fears and limit math knowledge (or even promote incorrect math knowledge), constraining parents' interactions with their children about math, even at the preschool level.

Reflections and Implications for Future Research

There is still a sizable gap in our understanding of what kinds of interventions (and which aspects of an intervention) increase parents' home involvement with children on math, leading to the active participation by different groups of parents and, ultimately, to improved numeracy readiness and mathematics skills in young children. This is due to several limitations in the extant intervention studies.

For example, the intervention studies reviewed here were conducted in cities with respectable but relatively small samples — ranging from 28 to 56 child-parent dyads. Certain samples were connected to particular interventions. Mainly minority families with low incomes participated in the two strong curriculum-based interventions, whereas mainly Caucasian, middle-to-high-income families were included in the numeracy awareness interventions. The strong, randomized study of the Family Mathematics Curriculum (Starkey and Klein, 2000), as well as the Getting Ready for School program (Noble et al., 2012), provides good information about the potential strength of curriculum-based interventions for families with low incomes, but the results cannot be generalized to other populations. In the numeracy awareness interventions (Vandermaas-Peeler and colleagues, 2011, 2012), it may be that middle-to-high-income parents in the control groups of these studies already conducted math-related interactions with their children (for example, activities that involve counting, measuring, sharing, and paying with money) when opportunities arose in everyday life; therefore, there was not a large enough differential between the groups to see the effects of the intervention. Future research with larger and more diverse samples and with measures of specific learning activities at home conducted by parents in treatment and control groups will be needed to clarify some of the unknowns about family involvement at home on math learning.

The nonintervention studies also contribute valuable information for future research and for teachers' practices to engage parents on math. For example, studies that used direct and specific measures of parents' activities at home or their attitudes about math were more likely than studies using composite measures of involvement to report positive results on children's math skills. This suggests that studies examining the link between the home environment and outcomes should use domain-specific measures in the home and that educators aiming to increase children's math skills through learning activities at home should guide parents' understanding and conduct of targeted and enjoyable *math* activities.

Overall, more research — particularly, testing well-designed interventions on diverse populations in randomized studies using intent-to-treat designs — is needed on family involvement with children on math at the preschool, kindergarten, and early elementary grade levels. The research base, at present, is promising but too slim to know for sure that all parents — regardless of educational, socioeconomic, and linguistic backgrounds or other family circumstances — will overcome typical fears or avoidance of math (Boaler, 2009; National Council of Teachers of Mathematics, 2012) to conduct enjoyable and productive activities with their young children that will reinforce school goals for math learning. With more studies of feasible family interventions tested by strong research designs, it should be possible to grow the knowledge needed to guide schools' practices to engage parents in ways that improve more students' numeracy readiness both for the transition from preschool to kindergarten and for the transition from kindergarten to the primary grades.

Research Findings: International Studies of Family Involvement in Learning Activities at Home

Ten studies that were found of family involvement at home and children's mathematics outcomes were conducted outside the United States. Because there may be cultural differences in parenting and in schooling, the international studies that met the criteria for this review are reported in this section. As in the United States, some international studies examined family involvement specifically in math, whereas others used general or composite measures of family involvement in learning at home.

Of the five nonintervention studies selected for review, three focused specifically on family involvement in math, and two used a composite measure of family support for learning in general — all with statistical controls on child and family background variables. All but one study reported positive effects of the home learning environment on young children's math skills and scores.

Studies that examined parents' reports of their involvement in and support for math learning at home showed positive effects on children's math skills across a range of ages and countries, including 3-year-olds in Germany (Anders et al., 2012); 3- to 5-year-olds in Canada

(Skwarchuk, 2009); 5-year-olds in Canada (LeFevre, Skwarchuk, Smith-Chant, Fast, Kamawar, and Bisanz, 2009) and Greece (LeFevre, Polyzoi, Skwarchuk, Fast, and Sowinski, 2010); and 5- and 7-year-olds in the Netherlands (Kleemans, Peeters, Segers, and Verhoeven, 2012). The two studies that examined parents' reports of the frequency of their promotion of *general* learning at home (for example, letters, numbers, words, and reading) also found positive associations with math skills in 3- to 5-year-olds in Canada (LeFevre, Clarke, and Stringer, 2002) and in 5- and 7-year-olds in Great Britain (Melhuish, Phan, Sylva, Sammons, Siraj-Blatchford, and Taggart, 2008). Most of these studies utilized standard math assessments, such as the arithmetic subscale of the Kaufman Assessment Battery for Children, the quantitative concepts subscale of the Woodcock-Johnson, the Keymath Test-Revised, and the Utrecht Early Numeracy Test-Revised. Only one study (LeFevre et al., 2002) used researcher-created assessments of rote counting, object counting, and number recognition. (For all measures, see the individual studies in Appendix Table A.2.)

The study in Germany, which examined parents' reports of their involvement with children's math *and* literacy learning at home separately, found that both measures of parent involvement were positively related to children's initial math scores at age 3 but not to growth or change in math over time (Anders et al., 2012). Ironically, this study suggested that family involvement in reading activities at home was more strongly related to young children's math scores than to family involvement in math activities at home.

Additionally, two of these studies — both from Canada — provide a nuanced understanding of family involvement at home by delving deeper into specific math learning activities that parents conducted. Findings indicate that participation in more advanced or complex mathematics activities at home was more beneficial than relatively simple or basic activities for increasing children's math skills. Parents' reports of their children participating in *complex* numeracy activities at home (such as adding or subtracting objects, comparing, counting by 2s) were positively related to preschool children's Quantitative Concepts scores (on the Woodcock-Johnson; Skwarchuk, 2009). By contrast, participation in *basic* numeracy activities at home (such as counting objects, reciting numerals, printing numbers) was negatively related to preschool children's Quantitative Concepts scores. A related study found that a composite measure of parents' efforts to teach complex math and literacy activities (for example, printing letters, numbers, and words; reading words) was positively related to French- and English-speaking preschool children's scores on researcher-created object-counting and number-recognition tasks (LeFevre et al., 2002).

The one international study that did not find an association between parent involvement and children's math skills examined Canadian teachers' ratings of how involved parents were in their kindergarteners' education (Harper and Pelletier, 2010). The measure was based on just one question: "How often is this child's family involved in his/her education?" This is a weak

measure, based on teachers' views of parents' behaviors. The nonsignificant result, though, raises several questions for future research concerning the accuracy of teacher reports about parent engagement. The study also raises questions about whether teachers followed the common practice of asking parents to be involved only if their children had poor or failing skills. Adding these parents to others who were highly involved could produce null effects, such as those found in this study, if parents of both high- and low-ability students are purposely highly engaged with their children about math.

The international studies confirm and extend the studies conducted in the United States with additional correlational evidence of positive associations of family involvement in math learning activities at home and young children's math skills. They also raise interesting questions for future research, such as whether *parents'* reports of their activities with children at home are more accurate and better predictors of children's tested mathematics scores than are *teachers'* reports of which parents are involved and what they do at home. One study's provocative finding that parents' interactions on more complex math activities at home may be more beneficial for children's math outcomes (Skwarchuk, 2009) raises important questions about what is the optimal content of age-appropriate and ability-challenging activities — both basic and advanced — that should be encouraged at home, how to guide parents so that all parents and children can participate, and what effects these efforts have on children's math learning.

Family Involvement at School

Eight nonintervention studies across a range of children's ages and grade levels examined connections of family involvement at school and children's mathematics skills. All the studies included strong statistical controls of family background factors, and most based analyses on large, longitudinal data sets. Although each study defined parent engagement or family involvement at school in slightly different ways, most included composite measures of parents' participation in parent-teacher meetings, parent-school organizations, volunteering, and school fundraising.

The studies reported mixed results, as family involvement at school had some positive and some nonsignificant relationships with students' math learning. In two studies using hierarchical linear modeling and strong control variables, a composite measure of parents' involvement at school had small-to-moderate positive results for preschoolers' math readiness ($d = 0.36$; Woodcock-Johnson Applied Problems) (Powell et al., 2010) and kindergarteners' math skills (effect size = 0.04; ECLS-K math) (Galindo and Sheldon, 2012). A meta-analysis of intervention and nonintervention studies mainly of older children reported that family involvement at school was related to children's math skills *and* even more clearly was linked to students' general or composite achievement than specifically to math achievement (Fan and Chen, 2001).

In contrast, one study using a composite measure of family involvement at school (that is, items on parental investment, educational attitudes, and encouragement of education) was unrelated to growth in children's math skills (Woodcock-Johnson Applied Problems) from grades 1 to 5 (El Nokali et al., 2010). It is important to note that this study did find positive connections of family involvement at school — and patterns of change in that involvement — on children's social-behavioral outcomes but not on their academic outcomes. Two other studies also reported no significant relationships between parental involvement at school (measured as a composite by child report) and children's math skills in kindergarten (Peabody Individual Achievement Test [PIAT]; Zhan, 2006) and eighth grade (standardized math test scores; Haghightat, 2005).

It is noteworthy that some studies of older children (that is, early elementary and middle grades) provide an interesting finding that should be followed up in future studies. Parental involvement at school has been shown to boost math outcomes of children in economically distressed neighborhoods more than for children in other neighborhoods (Catsambis and Beveridge, 2001; Greenman et al., 2011). To check this result, future research should examine the moderating role of neighborhood environment and socioeconomic status on family involvement at school and its impact on preschool children's math skills.

In sum, the strongest or clearest nonintervention studies in this review (those utilizing large, longitudinal data sets; a strong set of control variables; and analyses of effect sizes) measured the connections of family involvement at school and children's mathematics outcomes. To date, it appears that large-scale survey items on family involvement tend to focus on involvement at school more than involvement at home. These large studies, however, yielded inconsistent results of the connections of family involvement at school and children's math outcomes. The discrepancies may be due, in part, to the often-limited measures within large data sets that address many school topics with just a few questionnaire items, which are completed by different reporters — children, teachers, or parents. The lack of focus, depth, and consistency of measures of parental involvement at school and at home make syntheses and comparisons across studies difficult. Nevertheless, across all the studies reviewed here, reports from parents about their involvement resulted in more positive associations with students' math outcomes than reports from school-age children (Haghightat, 2005; Zhan, 2006).

School Outreach to Engage Families

The studies summarized above overwhelmingly agree that family involvement at home helps boost children's math skills in preschool and the early elementary grades. Most of the nonintervention studies on learning activities at home measured parent reports about their own naturally occurring learning activities at home, not whether they were guided by teachers. The intervention studies, although prompting for more family involvement, were based on designs and

evaluations by researchers and not teachers. The general agreement across studies of the importance of parental involvement for child outcomes suggest that teachers would find many good partners by using the results of research to develop programs or to conduct practices that guide more and different parents to interact with their children on math.

Several studies examined how schools reach out to involve families with their children at home and at school. School programs to engage families have been studied by researchers in various ways, including reports from principals (for example, Galindo and Sheldon, 2012; Holt and Campbell, 2004) and from teachers, parents, and students (for example, Haghigat, 2005; Van Voorhis, 2011). School outreach specifically on math also tends to include various activities linked to six different types of involvement (Epstein et al., 2009; and see Appendix B), such as home visits or workshops with parents about math, parent-teacher conferences for students who need extra help on math, math volunteers at school, family math nights, math interactive homework or other home learning activities, math projects and materials supported by the parent organization, and community partners' investments and assistance on math readiness and early math skill development.

Research Findings: School Outreach to Engage Families

Intervention Studies

The *Partnership Schools Comprehensive School Reform (CSR)* model organized school improvement teams that included attention to family and community engagement. The Math Partnership Team (like the teams for improving reading, school behavior, or other goals) included parents along with teachers, administrators, and community partners as team members focused on the school's math program's strengths and needed improvements. A case study investigating the implementation of the CSR model over three years in a Title I elementary school showed that when math teachers across the grades (K-5) implemented the *Teachers Involve Parents in Schoolwork (TIPS)* process in math, most parents became involved, were grateful for the guidance that the TIPS activities provided without asking parents to come to meetings at school, and children's math scores on state tests improved over time, compared with scores in comparison schools (Epstein, 2005). (Title I provides federal funding to schools that have low poverty levels, in order to help students who are at risk of falling behind academically.) The percentage of students at grade level in grade 4, for example, on the state's math achievement test increased from 54 percent to 63 percent to 66 percent over three years, whereas the percentage of students at grade level in a comparison school changed from 54 percent to 51 percent to 60 percent (Epstein, 2005).

Other Intervention Studies with Older Students

Two interventions designed to improve parental involvement with children on math homework in the elementary grades showed positive impacts on children's math outcomes. In a longitudinal study that followed students from grade 3 to grade 4, randomly assigned teachers either used the *Teachers Involve Parents in Schoolwork (TIPS) Interactive Math Homework* process for one year or two years or conducted homework as usual with their children. Students in the TIPS classes had significantly higher patterns of parental involvement in and enjoyment of math homework, and TIPS students had higher standardized mathematics scores than did control group students (Van Voorhis, 2011). Although TIPS math materials are available for students and their families starting in kindergarten and have received good anecdotal reports from parents and teachers, controlled studies examining the effects of TIPS on math learning have not been conducted in the youngest grades.

Additionally, a nonrandomized intervention study of fourth- and fifth-grade students in a "math pairs" program that was designed to use parents as partners for problem-solving assignments at home reported that students made greater gains in problem-solving skills than did comparison students who did not have parent partners (O'Connell, 1992).

Nonintervention Studies

Schools' systematic outreach to involve parents has been shown to be significantly and positively related to mathematics outcomes of preschool to high school children, after controlling for child, family, and school characteristics (Galindo and Sheldon, 2012; Haghghat, 2005; Holt and Campbell, 2004; Schulting et al., 2005; Sheldon, Epstein, and Galindo, 2010). For example, studies conducted at the time of students' transition from preschool to kindergarten reported positive associations between preschool programs' outreach efforts and (1) kindergarteners' gains in math skills on the ECLS-K math test over one year (Galindo and Sheldon, 2012) and (2) kindergarteners' composite academic achievement scores (ECLS-K composite) at the end of the kindergarten year (Schulting et al., 2005). Schulting and colleagues (2005) examined several school-level transition practices, finding that one — parents and children visiting kindergarten classrooms while still in preschool — was significantly and positively associated with kindergarteners' achievement. This transition activity also interacted with parents' socioeconomic status (SES) such that the positive effect of parents' engagement in the transition process on achievement scores in kindergarten was greater for children from families with lower SES than for children from families with higher SES.

The small number of nonintervention studies provided initial clues that schools' outreach to engage parents is positively related to children's math and other achievement outcomes. There also is some evidence that parents' involvement at school strengthens this relationship, suggesting that school outreach efforts may increase family involvement at school,

which, in turn, may help improve children’s math outcomes (Galindo and Sheldon, 2012). The studies of school outreach — particularly, the intervention studies in the elementary grades that focused on math — provide a base for future research on the effectiveness of specific outreach strategies to engage all families. The current research — from which practical implications may be gleaned — would help preschool, kindergarten, and primary-grade teachers develop clear and enjoyable materials for parents and children to use at home to reinforce and extend classroom math lessons.

Supportive Parenting Practices

Many studies conducted over decades confirm the importance of supportive parenting practices — including warm, caring, and intellectually stimulating home environments — for children’s learning and development. In this overview, we reviewed seven studies of supportive parenting activities in which researchers also measured students’ numeracy readiness or early mathematics skills.

Nonintervention Studies

Nonintervention studies that were reviewed for this report found positive concurrent and longitudinal connections of supportive parenting and children’s math outcomes. For example:

- Parents’ intellectual stimulation and emotional support observed at home was positively related to 5- to 9-year-old children’s mathematics scores on the Peabody Individual Achievement Tests (PIAT) in mathematics (Crane, 1996) and TEMA-2 (Blevins-Knabe, Whiteside-Mansell, and Selig, 2007).
- A study of kindergarteners showed that the positive association of their mothers’ involvement at home on math achievement (PIAT) became even stronger if the mother and child had a warm and supportive relationship (Simpkins, Weiss, McCartney, Kreider, and Dearing, 2006).
- Other factors — such as parents’ beliefs or expectations about their child’s liking of and ability in math — were positively related to children’s mathematics scores on TEMA-2 (Blevins-Knabe et al., 2007), a math test developed by Educational Testing Service (ETS; Catsambis and Beveridge, 2001), ECLS-K math (Galindo and Sheldon, 2012), Sequential Assessment of Mathematics Inventories (SAMI; Huntsinger et al., 2000), and PIAT (Zhan, 2006).

In sum, the studies revealed that supportive and positive parenting was linked to children's math skills. Studies varied in concluding whether parents' engagement in learning activities at home was associated more with children's development of "informal" math knowledge through everyday math activities and spontaneous play that requires counting and related skills (Blevins-Knabe et al., 2007) than with children's development of formal math knowledge or formal math test scores (Crane, 1996). This topic will need attention and clarification in future studies of supportive parenting for learning at home and children's math outcomes.

Summary of Results of Studies of Family Involvement with Children in Mathematics

Stepping back to look at the broad field of research on school, family, and community partnerships, it must be recognized that there are more studies of and a greater emphasis on family involvement in reading and literacy activities at home than in math or other subjects. Fewer studies have focused on math, with fewer details about family involvement activities and less specific results for children's math learning. Despite this, the studies reviewed in this chapter indicate that parents with diverse backgrounds can and do engage their children in math-related learning activities at home. They may do so on their own, or they may be guided by children's teachers. They may conduct activities that promote basic and/or more advanced mathematics skills (for example, Skwarchuk, 2009). They may use formal, direct teaching strategies or informal, indirect, and spontaneous interactions to facilitate their children's development in math (for example, Huntsinger et al., 1997).

Although some parents support and promote their children's math skills at home, parents tend to place greater emphases on literacy, as they report activities and resources related to pre-reading and literacy more often than they report numeracy-related activities and resources (Anders et al., 2012; LeFevre et al., 2009). This may be because not all parents feel comfortable and confident about conducting math activities with their children, even in the early years (Pan et al., 2006). Many parents have math phobias, based on their own poor experiences with the subject (Boaler, 2009; National Council of Teachers of Mathematics, 2012). They worry that they do not know math well enough to teach it or that they will do something "wrong" if they show their children even simple math skills in a different way from the teacher. This may be particularly true for parents who find it easy — even joyful — to read stories with their children and, thus, may turn to literacy readiness activities at home more often than math readiness activities.

The fact that some parents may have negative attitudes toward or fear of math makes the findings from the studies reviewed here even more important. New studies can build on the encouraging results from the stronger intervention studies, as well as the relatively weaker correlational studies, of parental involvement with math in the early years. Emerging topics

for new research include (1) studies that capture measures of parents' attitudes about math; (2) studies that address parents' attitudes about math when implementing well-designed interventions to increase the involvement of parents with children on math skills; and (e) studies of educators' outreach through practical presentations, workshops, and materials designed to ease parents' fears and increase parents' *and* children's knowledge of and positive attitudes toward math.

Positive Association of Family Involvement at Home and at School with Children's Math Outcomes

U.S. and international nonexperimental studies overwhelmingly reported positive associations of parent involvement activities in the home, particularly those that match math-focused measures of involvement with children's mathematics outcomes. It is interesting that more direct or formal practice activities (Huntsinger et al., 1997; LeFevre et al., 2010) and parent-child interactions promoting age-appropriate yet challenging math skills (LeFevre et al., 2002; Skwarchuk, 2009) may improve children's math skills and scores more than indirect or informal parent-child interactions and activities that are focused on basic math skills. Other studies reported related findings that the general responsiveness and intellectual stimulation of the home environment was positively related to children's math outcomes.

If these patterns of results are supported in new studies, they have implications for the design and content of materials developed by educators to reach out to engage all families with their young children in math learning. They tell teachers not to shy away from helping parents and children engage in and enjoy stimulating math activities that will strengthen and advance students' math skills. However, teachers may need to provide explicit math guidance and example activities, especially for parents who may feel less comfortable or even afraid of math. Studies indicate that most parents would welcome guidance and prefer a more coordinated effort between them and the teachers regarding teaching their children (Noble et al., 2012; Van Voorhis, 2011).

The few intervention studies reviewed here corroborated the positive associations of family engagement on math and students' math learning, providing promising evidence for a causal link between family involvement and math. But the paucity of experimental work on this topic in the early years does not allow strong, causal conclusions to be drawn regarding the impact of parent involvement activities in the home on children's math outcomes. Nonetheless, the interventions demonstrated several different ways that educators might guide parents to become more supportive of and engaged with their children's math development. The interventions included both explicit training in workshops for parents and other kinds of communications and materials to guide these interactions.

Two types of interventions had strong, positive effects for improving child outcomes. First, targeted workshops conducted over several weeks that prepared and actively involved parents in conducting specific math activities with their children increased young children's mathematics skills compared with "preschool-as-usual" situations. By contrast, short-term interventions that simply suggested that parents get involved in impromptu math-related experiences that occur in daily life did not differentially affect children in treatment and comparison groups. Despite relatively small samples, the effective intervention studies are valuable for their several strengths, including randomized designs, targeted parent training sessions conducted by trained staff, and the development and use of relatable math activities. Most importantly, these studies showed the potential of such targeted, curriculum-based parent interventions to effectively impact children's math outcomes.

Second, well-designed interactive homework activities that guide parents' interactions with students on core-learning math skills increase students' math scores compared with "homework as usual," which typically does not help parents discuss math and real-world applications of specific skills with their children (Epstein, 2005). Such interactive homework approaches broaden our view of the types of interventions with parents and children related to math that may effectively improve children's math outcomes (Van Voorhis, 2011).

Although all students may benefit from well-designed, goal-linked family engagement activities, several studies indicated that minority group students in underserved settings (such as Head Start Centers) may benefit most from family engagement in math at home and from thoughtful transition activities that prepare preschoolers for the move to kindergarten (Greenman et al., 2011; Schulting et al., 2005). Children from families with low incomes may be less likely to have parents who are comfortable and confident about conducting math experiences at home unless given some guidance from teachers. These children also are more likely to be in preschool settings that have fewer math-related resources, less qualified teachers for math instruction, and fewer activities to guide children's and parents' transition to kindergarten. It may be that, in these settings, school policies that encourage parental engagement in math at school and at home, well-designed outreach activities, and well-articulated transition activities will be particularly helpful to increase parents' confidence in and interactions with their children on math as well as their children's math skills.

Finally, several studies showed small-to-moderate direct effects of school outreach efforts to promote family involvement on children's math skills. One study indicated that involvement at school was a partial mediator of the relation between school outreach to parents and children's math outcomes (Galindo and Sheldon, 2012). This suggests that teachers' efforts to engage parents at school may send a message about their school's culture — that recognizes all parents as partners in children's education — which may encourage parents who are typically uninvolved to become engaged at school and with their children at home.

Summary and Reflections: Family Involvement with Children on Math Activities

Most of the research reviewed here linking parents' engagement with their children at home and at school in the early grades with children's math skills were nonintervention studies. The results of these studies are *correlational* and cannot provide evidence of *causal* effects on children's math learning. At this early stage of research on family involvement with students in math, the studies completed to date produced many important patterns *and* many unanswered questions for future research to build a stronger knowledge base and clearer conclusions about the impact of parent engagement in math on children's math outcomes.

In this review, the strongest nonintervention studies — those conducted with large, longitudinal, and diverse samples and with data based on comprehensive measures of family and student backgrounds — focused on family involvement at school more than family involvement at home. The lack of comprehensive measures of involvement at home in large-scale data sets suggests that such measures must be developed and added to future longitudinal studies to learn more about the nature and effects of parental engagement at school *and* at home for student learning.

New research on parent involvement with children on math activities should use measures of parents' engagement with their children at home that differentiate between activities related to learning in general and activities related to specific academic domains matching basic school subjects (for example, literacy and math readiness in preschool). Measures of subject-specific involvement are needed to clarify the links between specific ways that parents engage their children at home in math and theoretically linked math outcomes.

In addition, new nonintervention studies will be most useful if the measures zero in on the particular methods used at home by parents (for example, formal versus informal methods) to teach different kinds of math skills (for example, basic versus advanced). Studies that include subgroups of parents from diverse cultures, parents with varying attitudes toward math, and both mothers and fathers will advance our understanding of how and how often math is supported at home and whether there are cultural or group differences in how to increase parents' involvement in math.

Interestingly, the vast majority of studies examined parents' reports of their own involvement in math with their children at home. Like any measure, however, self-reports have their own drawbacks, including potential social desirability bias. Future studies that use multiple methods — such as in-depth interviews of parents with behavior-based questions, students' reports and reactions to interactions about math at home, teachers' surveys or interviews with behavior-based questions, and observational measures of math activities in the home environment — may deepen our understanding of parents' promotion of math learning. Multiple

measures with views from differing reporters also will help determine the kinds of home math activities that are most beneficial to children and most enjoyable for parents and children. Such information could inform educators and researchers about design strategies or interventions that may increase parental engagement in math learning at home.

A few studies shone a spotlight on potential differences in how families with diverse cultural backgrounds may conduct math learning activities at home. The results of these studies suggested that families with different cultural backgrounds may be more familiar with or more comfortable conducting particular kinds of math activities with their children at home (Guberman, 2004; Huntsinger et al., 1997; Pan et al., 2006). This has implications for how children from different backgrounds respond to math activities and experiences provided in school, depending on the alignment with what was taught at home. There were, however, too few studies to draw conclusions about cultural differences in family engagement or their effects on child outcomes in math. Future research may illuminate cultural differences in parents' interactions with their children and whether this has implications for teachers' culturally relevant pedagogy and for designing activities to promote parent engagement in math with children at home.

The findings from a few intervention findings are promising, although experimental research on family involvement with students in math is still very limited. Intervention studies that are randomized and well implemented with larger and more diverse research samples are critically needed across the early childhood and early elementary school years. These studies should try to clearly identify the kinds of home math activities conducted by parents that are most beneficial to children. The studies also should make explicit how educators may help more parents to feel comfortable about initiating math interactions and to conduct learning activities successfully with their children at home. Such work also needs to consider how to guide *all* parents in supporting their children's learning in math (and other subjects), starting in the earliest grade levels, regardless of their cultural, educational, socioeconomic, or linguistic backgrounds.

Very few intervention studies reported on parents' reactions, but those that did found positive responses to the information and guidance that they received in the intervention group (Noble et al., 2012; Vandermaas-Peeler et al., 2011, 2012). Future parent-focused intervention studies need to consider how they affect not only children's math outcomes but also parents' math attitudes, knowledge, skills, and teaching methods. For instance, future research should include parents' reactions as "interim outcomes" that may help explain whether the intervention leads to the "ultimate outcome" of improving students' numeracy readiness and early math skills.

Chapter 4

Summary, Reflections, and Recommendations

The studies reviewed in this report are, to our knowledge, the strongest conducted primarily over the past decade on the nature and effects of family involvement on young children's reading and math readiness and behavior for success in school. Chapters 2 and 3 — which review research on the connections of family involvement with children on literacy- and math-linked activities — present separate and specific conclusions, recommendations for new research, and implications for practice. This chapter summarizes general findings for the full set of 95 studies on family involvement and children's literacy and math learning and discusses crosscutting recommendations for research and for improving practice.

Across the studies reviewed, we were able to draw two main conclusions. First, the majority of studies, including some randomized controlled trials, demonstrate that — across the four categories of involvement — *family involvement is positively linked to children's outcomes* in preschool, kindergarten, and the early elementary grades. A preponderance of research confirms the link between family involvement and children's literacy skills, and a number of studies demonstrate positive relations with children's math skills. A few studies also show positive associations with children's social-emotional skills. This shows that naturally occurring or spontaneous family involvement is related to child outcomes. In general, the weakest link between family involvement and children's outcomes that was found in this review was for family involvement at school; many of those studies found mixed results for the association between children's academic outcomes and the actions and interactions that parents and other family members have at the school building with school staff. Many studies were strong nonexperimental studies that analyzed longitudinal data and/or statistically controlled important child, family, and school background factors. These studies provide intriguing considerations and implications for research and practice.

Second, the studies that specifically tested parent interventions demonstrated that *intervention matters*. As noted in Chapter 2 and 3, there is variability in the rigor of study designs, with only a minority of studies employing the strongest design from which to draw causal conclusions: experimental studies that use random assignment. Across all studies, random assignment of parents or children to treatment and control conditions occurred in a total of five studies that demonstrated positive results. Additionally, eight intervention studies with comparison groups but no random assignment also provide evidence for positive results for children, lending considerable confidence in these conclusions. These intervention studies (both randomized and not randomized) tended to show that parents with diverse backgrounds can respond to direct guidance and become more engaged with their children on literacy and math activities.

When they do, their children increase their reading and numeracy skills, on average, more than children whose parents are operating on their own. It should be noted that this review indicates that even well-designed intervention studies have small-to-moderate effects on student learning.

In sum, the review supports and extends conclusions of prior overviews and countless studies demonstrating that children who face economic, health, and social challenges; language lags; and other risk factors need more and better learning opportunities at home and at school. In some instances, targeted attention and extra help increased these students' achievement and reduced typical gaps in achievement between these students and those without such problems. Several studies, particularly in Chapter 2, indicate that parents of children who lagged in literacy skills responded to well-planned outreach activities and used well-designed materials to support and strengthen their children's learning at home or became partners with teachers at school.

Crosscutting Implications

Several crosscutting implications for research and practice can be gleaned from this review. They are discussed below.

Importance of Aligning Family Involvement Activities — and Measures of Them — with Specific Child Outcomes

Many studies in this review illustrate that goal-linked and subject-specific measures of family involvement are more likely to show positive associations with children's reading, math, and social-emotional skills. Both literacy and math *nonintervention studies* reveal that composite or general measures of involvement make it difficult to know whether or how particular parental practices affect specific results for students. Composite measures of parental involvement at school, for example, confound separable *types* of involvement (Epstein, 2011) and confuse the reasons that parents communicate with teachers or use their time and talent to assist teachers and children at school. Similarly, composite outcome measures (for example, combined reading and math test scores) often confound and muddy our understanding of whether and which parental involvement actions contributed to specific learning outcomes.

The randomized *intervention studies* underscore, support, and give credibility to the conclusions of most of the nonintervention studies that goal-linked family involvement activities help to produce goal-linked results for students. For example, in the studies of reading readiness, children increased their reading and vocabulary skills when parents were engaged in related activities, such as shared-book-reading and discussion activities. One math study directly tested this assumption, finding that preschoolers did better in math (but not in literacy) when parents were engaged with them on math-related activities at home. Confirmation by many studies about the strength of matching goal-linked involvement of parents with specific-subject

outcomes of students should end lingering beliefs that just doing “anything” with parents will produce achievement results for students. More than prior overviews, then, this report shows why future studies should use subject-specific and goal-linked measures of family involvement and theoretically linked achievement and behavioral outcome measures to test whether and how parental involvement affects children’s learning and development.

Importance of Targeted and Sustained Interventions

Although there is still much to be learned about the particulars in terms of how to design interventions that effectively promote family involvement and child outcomes, there are some crosscutting themes that can be drawn from both the experimental and the nonexperimental studies. To date, interventions seem to be more effective when they are targeted and sustained. Studies are more likely to show effects on whatever outcomes the intervention was specifically designed to influence. Thus, the strongest effects tend to emerge when studies examine clearly defined and goal-linked interventions in relation to outcomes that theoretically and logically flow from that intervention’s theory of change.

In addition, several experimental studies demonstrate the power of extended or sustained intervention over time. The importance of interventions being sustained was suggested by experimental math studies that found positive effects for semester-long, curriculum-based, intensive interventions (Noble, Duch, Darvique, Grundleger, Rodriguez, and Landers, 2012; Starkey and Klein, 2000) but not for weeklong, less intensive interventions (Vandermaas-Peeler et al., 2011; Vandermaas-Peeler et al., 2012). This conclusion was supported in experimental studies that specifically examine cumulative effects of interventions. For example, children whose parents participated in the Play and Learning Strategies (PALS) intervention in both infancy and toddlerhood experienced greater gains in language and behavior than children in intervention groups participating in only one developmental stage or the control group (Landry et al., 2012). When teachers used the Teachers Involve Parents in Schoolwork (TIPS) intervention over two years, effects were stronger for student math gains than when TIPS was used only for one year (Van Voorhis, 2011). Similarly, the Partnership Schools Comprehensive School Reform (CSR) model showed gains for students on the state’s math achievement test after three years of TIPS math implementation (Epstein, 2005).

Importance of Longitudinal Data and Measures of the Change Process

This review spotlights several studies that measure *change* in family involvement. The studies demonstrate not only that family involvement — at one point in time — is likely to matter for children’s outcomes but also that *positive change* in family involvement is associated with better outcomes, as well. Such longitudinal studies add critical new information to cross-sectional findings. For example, if a cross-sectional study finds that families are more involved

when children are in younger grades than when they are in older grades, we are unable to tell whether this difference is due to natural changes in family involvement over time or because there are different families at the different grade levels. Longitudinal research can help clarify such findings. They are able to show with more rigor than cross-sectional studies whether and how the trajectory of family involvement changes as children develop and move through different grades. They are also able to explore whether different family involvement trajectories are related differentially to children's outcomes. Finally, longitudinal studies that measure change in both family involvement practices *and* student outcomes are better equipped to examine the dynamics — and potential bidirectionality — between family involvement and children's outcomes over time.

Importance of Attention to the Transition from Preschool to Kindergarten

More than prior reviews, this report highlights studies of the transition process from preschool to kindergarten as an *indicator* of schools' outreach to communicate and connect with parents of young children. In this review, only nonintervention studies addressed this topic, but they all indicated that specific, thoughtful, and well-planned strategies and creative orientation and welcoming practices not only helped children and their parents adjust to a new school but also were associated with better child outcomes. The studies suggest an important area of inquiry for future research on school outreach to engage all parents in ways that affect young children's learning as well as their attitudes toward and behavior in school.

Importance of Examining Mediating and Moderating Processes

This review identified several variables that may serve as moderators, influencing the strength of the relation between family involvement and children's achievement and behavior. These include characteristics of the child and family, such as child age (some studies demonstrated differences in relations for preschool children in comparison with older children); family socioeconomic status (some studies suggested that children in underserved settings may benefit more from family involvement and transition activities that prepare preschoolers for kindergarten); and child ability level (certain interventions seem to be less or more effective for different populations of students — for example, children with no learning disabilities versus those with language delays). Potential moderators at the school level include the expertise and effectiveness of teachers in engaging students and families as well as the school partnership culture and welcoming environment.

Studies also suggested some potential mediating variables that may explain the relation between family involvement and child outcomes, including parents' beliefs and attitudes (for example, about math, literacy, learning in general, their role in their child's learning, the importance of an intervention); children's beliefs and attitudes about learning; and teachers'

beliefs and attitudes about family involvement. Mediating processes will become clearer as more research investigations assess child, family, and teacher attitudes before and after interventions.

Importance of Linking Research to Practice

It is well documented by nonexperimental studies that, presently, *some* parents conduct activities that support and increase their young children's learning without any encouragement, although their focus tends to be more on literacy-related activities than on math-related activities. In this review, the intervention studies of family involvement in literacy- and math-linked activities reveal that *all* parents can do so.

Many surveys of parents, conducted over decades, have indicated that parents want and need clear information, ideas, and guided practice to interact with their children in effective ways. Studies in both Chapters 2 and 3 reveal that all parents — in diverse racial, ethnic, and socioeconomic groups — can become more involved in their children's education, particularly when provided with clear and feasible ideas for conducting basic and enjoyable reading and math activities with their children in preschool and in the early elementary grades. The findings across studies suggest that it will be necessary to do more than entreat parents to be involved. Rather, preschool and elementary schools, as well as community groups and leaders, must be intentional about including family involvement as an integral part of their school or program philosophy and about engaging families who, presently, may not be aware of which activities to conduct and how to conduct them to support their young children's literacy and math skills and school behaviors. This outreach is important for all parents, but especially so for those whose children are most at risk of having learning problems.

Furthermore, this review highlights an opportunity to strengthen the research-practice-policy connection in the field of family involvement. The integration of both empirical evidence and practice wisdom into the design, implementation, and evaluation of family involvement programs and strategies will help, in the long run, to ascertain knowledge of which specific practices are most effective and which are not. For example, the evaluation of family involvement interventions can be designed to include continuous feedback loops between researchers and practitioners. In this way, knowledge gained and adaptations made to make a program better suited to local contexts or families' and schools' needs can be fed back to the researchers and developers, where it can inform program refinement and, hopefully, increase program effectiveness. This idea of a data-driven, continuous improvement model is aligned with recent recommendations by the Advisory Committee on Head Start Research and Evaluation to help promote their New Parent, Family, and Community Engagement framework and strengthen Head Start programs' efforts in this important area (Advisory Committee on Head Start Research and Evaluation, 2012). Thus, an integrated and collaborative approach with both practi-

tioners and researchers working together — and policy supporting such a collaboration — would likely lead to the development of effective family involvement programs that can be implemented successfully in real-world contexts.

Recommendations for New Research

There always are more questions to ask and deeper details to uncover to fully understand complex and important issues, such as family involvement in young children’s literacy and math readiness for school. This review suggests five kinds of studies in the preschool and early elementary school grades that will advance knowledge and influence practice — particularly if the field is able to strengthen the connections among research, practice, and policy.

Studies That Delve into Details Unknown

The extant studies indicate, convincingly, that family involvement in subject-specific learning activities at home are positively related to children’s outcomes. They also demonstrate that parent-teacher communications are important. But to be more useful in practice, studies are needed that identify *which* involvement practices and *which* parent-school communications and strategies not only have direct and indirect effects on specific reading, math, and social skills but also increase the number of literacy- or math-learning activities that parents conduct with confidence — a likely key mediator to achieving change for children. Further, such studies need to identify which practices and communications are most effective for child outcomes (1) for all students and families, (2) for specific subgroups of students and families, and (3) at varying grade levels. And, finally, research needs to thoroughly examine and report on how these practices, communications, and strategies are implemented successfully. Such knowledge will have important implications for the design and implementation of interventions that hope to promote family involvement both at home and at school.

In addition, more studies are needed that examine potential moderators to ascertain for whom or under what conditions interventions that are designed to promote family involvement produce an effect *on particular child outcomes*. Studies that specifically examine potential mediators — such as child, parent, and teacher beliefs — can help provide details on the *mechanisms* and *paths of influence* that show how family involvement works to influence children’s learning in specific areas. They can also help to better inform parent interventions and school outreach. Finally, more research on fathers’ roles in family involvement is needed to balance the overwhelming attention paid to mothers in past studies. Just as intriguing is that basic research suggests that fathers’ role in children’s language and math development may often differ from the role of mothers, so it is important to consider whether effective strategies to support fathers’ involvement might look different than strategies designed for mothers.

Well-Designed, Rigorous Studies That Examine Immediate and Cumulative Effects of Family Involvement Interventions

Across the literacy and math studies in Chapters 2 and 3, there are, relatively speaking, few experimental studies in comparison with nonexperimental studies. The levels of evidence vary, as many of the individual intervention studies (even randomized controlled trials) may have some analytic or methodological weaknesses, including not using an intent-to-treat analysis or not reporting on study design flaws, such as whether there was differential attrition. Further, most of these studies paid minimal attention, if any at all, to implementation processes or intervention fidelity to an intended program model. (This issue is discussed further below, in connection with “scaling up” effective interventions.)

Intervention studies that randomly assign individuals to treatment and control groups are critical, particularly if they focus on previously understudied populations of parents and children with diverse backgrounds and learning problems. The nonintervention studies provide some ideas that may be useful to educators to help improve family involvement or transition activities. But strong experimental studies will be needed to clarify questions about which family involvement activities or interventions are optimal for improving child outcomes as well as for creating smooth transitions for children and parents from preschool to kindergarten and from kindergarten to the primary grades (and other major school transitions). Additionally, experimental studies would also be able to address such questions as whether and how particular interventions create more equitable involvement for diverse groups of parents and whether and how parental involvement contributes to closing the achievement gap between economically advantaged and disadvantaged students with diverse racial and ethnic backgrounds.

It should be noted again that this review shows that even well-designed intervention studies have small-to-moderate effects on student learning. Similarly, the best-designed nonintervention studies with longitudinal data and strong statistical control variables also yielded small-to-moderate effects on students’ learning. (Effect sizes vary by context, but it is generally accepted that an effect size is large at 0.8 [that is, 8/10 of a standard deviation unit], moderate at 0.5, and small at 0.2 [Cohen, 1988].) Yet, what has been missed by researchers’ and educators’ impatience with small-to-moderate effects is that these effects can be *cumulative* across age and grade levels if the interventions and good practices are sustained over time. For example, proximal effects of family involvement activities in reading or math readiness may be small to moderate, but sustained guidance for family involvement in subsequent years may build on children’s initial achievement gains and may help them continue a successful trajectory in preschool, elementary school, and beyond. Further, studies of cumulative effects of interventions could show whether and how teachers’ attitudes about and interactions with parents change over time, whether and how parents establish and improve their attitudes and confidence

about supporting their child’s learning at home and involvement at school, and the cumulative (or additive) effects of these things on children’s learning.

Studies That Collect and Analyze Longitudinal Data

This review notes the important information that can be gleaned from studies that measure *change* in family involvement and child outcomes. More studies are needed on the effects of increasing or decreasing/sustaining family involvement activities over time. These studies will strengthen the knowledge base on the nature and effects of patterns of change in family involvement in learning activities at home, supportive parenting, family involvement at school, and parents’ attitudes and expectations about their children’s school and learning.

Studies That Examine the Link Between Family Involvement and Both Math and Social-Emotional Skills

The results of this review indicate that additional, rigorous research is needed to examine the links between family involvement and math and social-emotional outcomes to catch up with the status of the more prevalent studies of reading and literacy. These are important areas for future research, especially as some have articulated that young children’s social and emotional preparation for school may be most important for advancing reading and math skills in kindergarten and the early grades (Powell, Son, File, and San Juan, 2010). In this review, measures of children’s social-emotional skills were typically “tacked on” to studies of early reading readiness more than to studies of math. Questions were typically general, not specific. Few studies that we examined were able to show a link between specific strategies of parental involvement to particular behavioral outcomes, simply because they did not typically include those outcome measures.

Studies That Examine the “Scale-Ability” of Research-Tested Programs and Practices of Parental Involvement with Children on Reading and Math

Presently missing and much needed in the field are studies of the processes to “scale up” effective interventions and the results of those efforts to engage all parents; change parents’ behaviors; and improve reading, math, and social-emotional readiness of young children in preschool and kindergarten. Taking good practice to scale may help large numbers of parents become involved in productive, feasible, and fun ways and could be useful for large numbers of students — particularly those with risk factors that affect learning and development — be ready for preschool and kindergarten. Such studies are critical to help ascertain the most successful ways to scale up effective, research-based practices for general use. Of course, this is a huge agenda that only can be addressed incrementally over an extended time period.

Scale-up studies can take intervention studies to the next level by moving the conduct of treatment and control group practices from researchers' tight controls to real-world tests of teachers' practice in preschools in economically and geographically diverse communities. Scale-up studies are able to ask new questions, such as: How can proven practices of family and community engagement with children in reading readiness, math readiness, and school-related behaviors become the "new normal" of all preschool and elementary school organizations? What leadership positions, official policies, professional development, ongoing technical assistance, sharing of best practices, and other processes are effective in engaging families in goal-linked reading, math, and behavioral activities with their young children? These issues of organizational design recognize that scale-up of research-based practice cannot rely on each parent or each teacher interpreting the results of research individually but, instead, that effective structures and processes must be in place to enable teachers to conduct tested practices with students' parents in feasible ways.

Finally, one important aspect of scaling up that tends to be overlooked is strategically focusing on program implementation and on documenting the details regarding how a program was implemented. This can provide a clearer understanding not only of what it takes to implement and scale up a program (successfully or not) but also of how a program is able to achieve (or not achieve) outcomes — within some particular context. It is not enough to know *whether* a certain program or strategy works, because this does not tell us *how* it works to achieve outcomes. For example, sometimes both short-term, low-intensity programs and long-term, high-intensity programs show effects, but sometimes they do not; sometimes a particular strategy works in one program but not in another. More often than not, we do not understand these discrepancies because the studies did not keep track of or report on how the program was implemented (Walker, 2013). Thus, studying how programs and strategies are implemented can illuminate whether what made them less or more effective was the way in which they were implemented or a particular context. Regarding the study of program implementation as an important and necessary component of a scale-up study can help start the process of disentangling what features or aspects of programs work and for whom.

Implications for Improving Practice

Presently, many preschool, kindergarten, and primary grade teachers develop and implement family involvement activities to encourage parents to conduct shared-reading and other reading and numeracy readiness activities at home. Their creative work is mainly voluntary, often guesswork, and usually inequitable — engaging already-involved parents while excluding parents who are already less involved. Scale-up studies of interventions that place an emphasis on examining and documenting both program effectiveness and program implementation will

help develop and test research-based strategies for outreach with more and different parents — working toward a goal of improving children’s learning and behavior.

Although more research is needed to fully understand parental involvement and its importance for young children’s early reading and math skills and readiness for school, *enough is known* to begin immediately to improve practice. The studies in this review indicate that, with guidance, many parents — regardless of socioeconomic, educational, and racial or ethnic backgrounds — are ready and able to conduct supportive parenting and learning activities at home with their young children. This review and many previous reviews and studies put to rest any notion that — if treated and guided with respect, good planning, and clear materials — certain groups of parents do not care or will not become involved in their children’s education.

For example, across studies of family involvement in reading and literacy, diverse parents and their children engaged in a variety of activities including but not limited to the ones shown in Box 4.1. These parent-child interactions were associated with positive results for

Box 4.1	
Reading and Literary-Related Activities Engaged in by Children and Families	
Shared book reading (general)	Visits to public libraries
Dialogue reading (specifics)	Family stories (reminiscing)
Home tutoring	Creative dramatics
Listening to a child read	Practicing specific reading readiness skills (such as letter of the week, sounding words, rhyming, looking at print, vocabulary, early writing, storytelling)
Family conversations of feelings/events	

children’s vocabulary, listening comprehension, rates of word reading, reading achievement test scores, quality of children’s narrative storytelling, story comprehension, and other reading readiness skills. These skills were measured by a host of assessments, including the Peabody Picture Vocabulary Test (PPVT), Woodcock-Johnson Letter-Word Identification subscale, Bayley Mental Development Index (MDI), Caldwell Preschool Inventory, Stanford Early School Achievement Test (SESAT), Teacher Rating of Oral Language and Literacy (TROLL),

third-grade Test of Language Development 2 (TOLD), Concepts About Print (CAP) test, and Recognition of Initial Consonant Sound and Alphabet (RICSA).

Across studies of family involvement in mathematics, diverse parents and their children engaged in a variety of activities including but not limited to the ones shown in Box 4.2. These parent-child interactions were associated with math knowledge and skills on variety of measures, including formal math assessments (ECLS-K standardized math test, Kaufman Assessment Battery arithmetic subscale, Kaufman Test of Educational Achievement math composite, KeyMath-Revised, PIAT, SAMI, TEMA-2, TEMA-3, Utrecht Early Numeracy Test-Revised, Woodcock-Johnson Applied Problems), researcher-created assessments (for example, enumeration task, numerical reasoning task, geometric reasoning task, how-many task, and number-recognition task), and state math tests.

Box 4.2

Math-Related Activities Engaged in by Children and Families

Counting	Recipes and cooking
Number learning	Money math
Home tutoring	Math skills on homework
Playing with shapes and puzzles	Addition and subtraction
Board games	Early addition at home

Today, more children attend preschool and all-day kindergarten than ever before. Educators are being urged by federal, state, and local policies to use research-based or evidence-based approaches in their practice. This review points toward family involvement as a potentially potent ingredient in efforts to improve children’s early learning and development. It puts forth several suggestions and implications — for both researchers and educators — on how to support family involvement at home and at school so that it effectively improves children’s learning. Moving forward, a stronger research-to-practice partnership that integrates both empirical evidence and practice wisdom into the research process — including the design, implementation, and evaluation of programs — will, in the long run, advance the field of family involvement further to understanding what works and promotes young children’s learning.

Appendix A

**Studies of Family Involvement in
Literacy Activities and Math Activities
and Social-Emotional Outcomes**

Family Involvement Literature Review

Appendix Table A.1

Studies of Family Involvement in Literacy Activities and Literacy and Social-Emotional Outcomes ($N = 52$)

NOTES: Kinds of parental involvement (PI) measured in the study: LH = learning activities at home; P = supportive parenting; FIS = family involvement in school; C = composite measure of family involvement at home and at school.

*An asterisk indicates that the study measured a social-emotional outcome.

d = report of effect size; b = unstandardized beta coefficient; β = standardized beta coefficient; PK = prekindergarten: ages 3 to 5; K = kindergarten.

A two-tailed t-test was used for all statistical tests presented in this table. Effect sizes are based on the standard deviation of an outcome for all members of a sample. Levels of statistical significance are indicated as follows: *** = .01 percent; ** = 1 percent; * = 5 percent.

Studies of Preschool Children (17 Studies)

Form of Parental Involvement	Citation	Age Group / Study Design	Type of Study / N (Number) / Sample	Cognitive/Socio-Emotional/Behavioral Outcome(s)	Overall / Other Results
Joint writing and joint reading intervention paired with two PI workshop sessions on related topics	Aram, D. and Biron, S. (2004). Joint storybook reading and joint writing interventions among low SES preschoolers: Differential contributions to early literacy. <i>Early Childhood Research Quarterly</i> , 19, 588-610.	PK (ages 3-5) Longitudinal, intervention, control group ANOVA	$N = 35$ in reading program $N = 36$ in writing program $N = 24$ in control group Tested beginning and end of school year Low-SES township in central Israel	Children in both literacy programs progressed significantly more than the control group on orthographic awareness $F(2, 89) = 17.29, p = 0.00$. There were 2 literacy sessions weekly (20 minutes) with student-mediator leader and 4-6 children, for about 66 sessions. Parents attended two PI workshops on related topics at the school. Joint writing (encouraged letter knowledge, phonological awareness and functional writing activities) did better than both control and reading groups (11 children's books for focusing on language and exploring major concepts raised by books) on phonological awareness ($F[2, 89] = 11.27, p = 0.00$), word writing, orthographic awareness, and letter knowledge. All	Important implications for PK literacy intervention content and design. Also, this study provided an interesting combination of intervention efforts in preschool, enlisting university students and pairing class efforts with related PI workshops. Intervention with multiple contexts converging for success.

Form of Parental Involvement	Citation	Age Group / Study Design	Type of Study / N (Number) / Sample	Cognitive/Socio-Emotional/Behavioral Outcome(s)	Overall / Other Results
				groups performed similarly on listening comprehension. Children ages 3-4 gained as much as did children 4-5 except for receptive vocabulary (PPVT), with the younger group progressing more than the older group.	
Parental involvement in children's education (10 items from Parent-Teacher Involvement Questionnaire), communication with teacher, volunteering, expectations about learning, care about education	Arnold, D. H., Zeljo, A., and Doctoroff, G. L. (2008). Parent involvement in preschool: Predictors and the relation of involvement to preliteracy development. <i>School Psychology Review</i> , 37(1), 74-90.	PK Not longitudinal Correlations / multiple regression	163 PK children from mainly low-income families 32% Puerto Rican, 29% African-American, 32% white, 7% multiracial 5 of 7 centers low SES, 2 of 7 centers high SES	Greater FI (communication with teacher, volunteering, expectations about learning, care about education) was associated with stronger preliteracy skills as measured by the PPVT-R. The relationship between involvement and literacy skills was positive and significant ($r [154] = 0.27, p = 0.001$). Involvement remained significantly correlated with the literacy composite controlling for SES ($\beta [152] = 0.23, p = 0.003$). The literacy composite included the PPVT, Developing Skills Checklist (DSC), Expressive One-Word Picture Vocabulary Score, and Print Concepts.	Greater FI (measured in ways tapping FI at school and at home) was associated with stronger preliteracy skills. Higher SES was positively associated with involvement, but involvement still predicted preliteracy development, controlling for SES.
C					
*Maternal language use, questions, positive feedback, support, and stimulation	Britto, P. R., Brooks-Gunn, J., and Griffin, T. M. (2006). Maternal reading and teaching patterns: Associations with school readiness in low-income African	PK Longitudinal Regression Seen at baseline and at 24	126 PK children of young African-American mothers in Newark Young Family Study (NYFS) within the Teenage Parent	Children with mothers expressing actions in the story tellers/support and teaching ($\beta = 0.43, p = < 0.0001$) and storytellers/support and low-teaching group ($\beta = 0.39, p = < 0.0001$) demonstrated more expressive language use (average number of total words spoken) than other groups. Children with mothers who were story readers/support and teaching had higher school readiness	Overall, mothers who were classified as story tellers had children with higher expressive language use than story readers. Story readers did not talk much to their children during book

Appendix Table A.1

Form of Parental Involvement	Citation	Age Group / Study Design	Type of Study / N (Number) / Sample	Cognitive/Socio-Emotional/Behavioral Outcome(s)	Overall / Other Results
LH	American families. <i>Reading Research Quarterly</i> , 41(1), 68-89.	months and 40 months after baseline; age at Time 1, about 7 months; age at Time 3, about 4 years	Demonstration (TPD) program	skills ($\beta = 0.23$, $p = < 0.05$). School readiness was measured using the Caldwell Preschool Inventory (48 items; taps colors, shapes, and general information).	reading together, while story-teller mothers used decontextualized language, asked more labeling questions, and provided more positive feedback. However, story readers with support and teaching had higher school readiness skills (colors, shapes, general information).
*Early parenting and changes over time, maternal supportiveness, home learning environment, parental stress LH, P	Chazan-Cohen, R., Raikes, H., Brooks-Gunn, J., Ayoub, C., Pan, B. A., Kisker, E. E., Roggman, L. A., and Fuligni, S. A. (2012). Low-income children's school readiness: Parent contributions over the first five years. <i>Early Education and Development</i> , 20(6), 958-977.	PK Longitudinal Ordinary least squares (OLS) regression	$N = 1,273$ Early Head Start Research and Evaluation Project Assessments at ages 1, 2, 3, and 5 42% white, 31% black, 22% Hispanic, 52% Early Head Start	Study assessed impact of learning environment and supportive parenting on <i>behavior problems</i> (12-item parent report from FACES study), <i>approaches to learning</i> (7-item parent report from FACES), <i>emotion regulation</i> (Leiter-R Examiner Rating Scales: reflects child self-regulation of affect and attention during challenging tasks), <i>receptive vocabulary</i> (PPVT-III), and <i>letter-word knowledge</i> (Woodcock-Johnson Letter-Word Identification [WJLWI] subscale). Learning environment had a positive relationship with vocabulary ($\beta = 0.20^{***}$) and WJLWI ($\beta = 0.17^{***}$). Change in learning environment did as well, though relationships were weaker ($\beta = 0.12^{**}$, 0.13^{**}). Supportive parenting had a positive relationship with vocabulary and WJLWI at 0.22^{***} , 0.14^{***} . Change in parenting had a positive effect on vocabulary 0.10^{**} but null effect on WJLWI. Learning environment had negative relationship to	Early positive dyadic experiences between mother and child have positive academic and socio-emotional outcomes for children. Concepts of parent stress, learning environment, and supportive parenting are not static. They can remain stable, increase, or decrease within a year and over a child's entire schooling experience.

Appendix Table A.1

Form of Parental Involvement	Citation	Age Group / Study Design	Type of Study / N (Number) / Sample	Cognitive/Socio-Emotional/Behavioral Outcome(s)	Overall / Other Results
				<p>behavior problems (-0.10*) and positive relationship to approaches to learning (0.16***). Change in learning approached significance for behavior and emotion and was positive for approaches to learning (0.08*).</p> <p>Supportive parenting was positive for emotion regulation (0.17***). Change in parenting was positive for emotion regulation (0.11**) and null for behavior and approaches.</p>	
An examination of the mediating role of maternal reading beliefs and activities between maternal education and emergent literacy skills	Cottone, E. A. (2012). Preschoolers' emergent literacy Skills: The mediating role of maternal reading beliefs. <i>Early Education and Development</i> , 23(3), 351-372.	PK Not longitudinal Regression /mediation analyses	N = 92 79% white, 16% black, 2% Hispanic 39% of parents had high school education only	<p>Maternal reading beliefs (Parental Reading Beliefs Inventory [PRBI]) and maternal education collectively accounted for 18.6% of the variance in children's print knowledge (Phonological Awareness Literacy Screening [PALS] - Preschool): significant effect $F(2, 89) = 10.17, p < 0.001$. Maternal education, however, did not have a significant and unique association with children's print knowledge, whereas maternal reading beliefs did ($\beta = 0.32, p < 0.05$). Maternal beliefs and education explained 10.4% of the variance in phonological awareness, which was significant, but education and beliefs were not significant individually. Beliefs approached significance. Beliefs were still a factor when maternal practices were included in model of print knowledge but were not a factor for phonological awareness.</p> <p>Phonological awareness was not related to literacy practices or maternal reading beliefs. Print knowledge was related to both reading beliefs and practices.</p> <p>Study emphasizes the importance of beliefs to effectiveness of home learning interventions. The specific type of PI program that may have a</p>	This study points to the powerful mediation effect of maternal reading beliefs between maternal education level and PK children's print knowledge and phonological awareness. Practices also play an important role, and both beliefs and practices should be addressed in intervention aspects of PI instruction relating to PK literacy.

Appendix Table A.1

Form of Parental Involvement	Citation	Age Group / Study Design	Type of Study / N (Number) / Sample	Cognitive/Socio-Emotional/Behavioral Outcome(s)	Overall / Other Results
				significant impact on outcomes is one that includes as much about parents' expectations or belief systems about their child's literacy development as about the kinds and the number of literacy activities in which parents participate.	
*Home-based involvement, school conferencing, school-based involvement (multiple dimensions) on multiple outcomes (conduct, motivation to learn, vocabulary, task persistence) LH, FIS	Fantuzzo, J., McWayne, C., Perry, M. A., and Childs, S. (2004). Multiple dimensions of family involvement and their relations to behavioral and learning competencies for urban, low-income children. <i>School Psychology Review</i> , 33(4), 467-480.	PK Not longitudinal Correlations / multiple regression	N = 144 children enrolled in central city Head Start in urban Northeast 96% African-American, 64% with annual income less than \$9,000	Home-based involvement was the strongest predictor of child outcomes, and it related positively to motivation to learn ($r = 0.35^{***}$), attention and persistence ($r = 0.36^{***}$), attitude toward learning ($r = 0.30^{***}$), receptive vocabulary ($r = 0.41^{***}$), negatively related to low conduct problems ($r = -0.30^{***}$), negatively to hyperactivity ($r = -0.24^{**}$), and negatively to inattention/passivity ($r = -0.20^*$). School-based involvement and home-school conferencing related positively to outcomes in bivariate relations. However, school-based involvement and school conferencing did not factor into child outcomes when considered simultaneously with home-based involvement. Home-based involvement positively predicted competence motivation ($\beta = 0.30^{**}$) 15% of variance, attention and persistence ($\beta = 0.31^{***}$) 14% of variance, attitude toward learning ($\beta = 0.24^{**}$) 11% of variance, receptive vocabulary ($\beta = 0.33^{***}$) 19% of variance; it negatively predicted conduct and hyperactivity ($\beta = -0.22^*$, -0.21^*) 12% and 6% of variance, respectively. The approaches to learning were assessed using the Preschool Learning Behavior Scale (PLBS); classroom problem behaviors were assessed using the Conners' Teacher Rating Scale-28; and	Family involvement factors play different roles at different points in children's development and influence outcomes depending on when they are assessed and measured. Home-based involvement is critical to both cognitive and social outcomes of PK children.

Appendix Table A.1

Form of Parental Involvement	Citation	Age Group / Study Design	Type of Study / N (Number) / Sample	Cognitive/Socio-Emotional/Behavioral Outcome(s)	Overall / Other Results
*Study of family involvement at home (reading at home; 11 home practices, such as talking about letters) and at school (volunteering), as well as communication-based and Head Start family outreach LH, FIS	Hindman, A. H., and Morrison, F. J. (2011). Family involvement and educator outreach in Head Start: Nature, extent, and contributions to early literacy skills. <i>Elementary School Journal, 111(3)</i> , 359-386.	PK Longitudinal hierarchical linear model (HLM) Academic skills assessed in fall and spring; parental home involvement interviews in fall and spring as well as school and communication-based involvement	N = 3,100 children and families enrolled in Head Start Family and Child Experiences Survey (FACES) 33% African-American, 34% white, 29% Hispanic, 5% other	HLM analyses revealed that family home involvement (letters and words) positively related to decoding skills (WJLWI-R) of children $b = 1.30$, $p < 0.05$. Family shared book reading related to vocabulary ($b = 0.25^{**}$ [PPVT-III]). Family school involvement (volunteering) related positively to vocabulary ($b = 0.54^{***}$). Family home involvement — including teaching about letters and words, conversations, and counting games — all had positive impacts on <i>approaches to learning</i> (7 items on approaches to learning and willingness to try new things [Zill, 2005]) ($b = 0.18$, 0.14 , 0.21^{**}). Home visits from Head Start had positive relationships to approaches to learning ($b = 0.12^{**}$). Center outreach encouraging reading related positively to family home involvement ($b = 0.17$, $p < 0.05$), and center invitations and communication related positively to family in-school involvement ($b = 0.09$, $p < 0.05$).	Head Start families were often involved in activities related to the learning of their children, and Head Start educators reached out. Both of these factors related to children's decoding, vocabulary, and positive approaches to learning, demonstrating the importance of these connections for children's early literacy and development.
*Three aspects of parenting behavior (materials and home learning environment [HLE]); warmth,	Hindman, A. H., and Morrison, F. J. (2012). Differential contributions of three parenting dimensions to preschool literacy and social skills in a	PK Not longitudinal Path model	N = 229 PK children (half in PK year just before K and other half in PK) 80% white,	HLE (home learning environment) significantly predicted code-related skills: alphabet knowledge ($\beta = 0.24^{***}$), decoding ($\beta = 0.21^{**}$ [WJLWI]), and cooperation ($\beta = 0.17^{*}$ [Social Skills Rating System-Parent Version]). Book reading approached significance with vocabulary (expressive [Woodcock-Johnson III	This study supports the notion of a multidimensional construct of parenting behavior in support of literacy, including HLE, WSE, and MD. Each of

Appendix Table A.1

Form of Parental Involvement	Citation	Age Group / Study Design	Type of Study / N (Number) / Sample	Cognitive/Socio-Emotional/Behavioral Outcome(s)	Overall / Other Results
autonomy, expectations (WSE); and management and discipline of child behavior (MD) on alphabet knowledge, vocabulary, social skills, and cooperation of PK students	middle-income sample. <i>Merrill-Palmer Quarterly</i> , 58(2), 191-223.		10% African-American, 5% Asian, 3% Arab-American, 2% Hispanic	Picture Vocabulary subtest]) ($\beta = 0.11$, $p < 0.10$). Autonomy support (WSE) and management of discipline (MD) did not predict literacy skills (alphabet knowledge, decoding, or vocabulary). WSE predicted cooperation ($\beta = 0.23^{***}$). MD predicted self-control ($\beta = 0.19^{**}$) and cooperation ($\beta = 0.18^{**}$). Higher levels of education predicted more frequent home focus on letters and sounds, book reading, and math, and white families read more than minority families.	these facets predicted cognitive and social skills in different ways. Limitations include the nondiverse sample.
LH, P					
*Experimental investigation of a responsive parenting program (infancy and toddlerhood) on shared reading between mother and child	Landry, S. H., Smith, K. E., Swank, P. R., Zucker, T., Crawford, A. D., and Solari, E. F. (2012). The effects of a responsive parenting intervention on parent-child interactions during shared book reading. <i>Developmental Psychology</i> , 48(4), 969-986.	PK Longitudinal, randomized, intervention, control group Effect sizes, mixed model repeated measures	$N = 167$ Play and Learning Strategies (PALS) (PALS I-II) (PALS I-DAS II) (DAS I-PALS II) (DAS I-II)	Randomized longitudinal evaluation of the effects of a responsive parenting intervention on the mother and child behaviors related to reading. Increases in mothers' praise and encouragement ($d = 0.34$) were greatest when mothers had PALS I and PALS II interventions. Many behaviors required both interventions: open-ended prompts ($d = 0.38$), language facilitation techniques ($d = 0.30$), and general verbal support that encouraged or demonstrated problem-solving skills ($d = 0.86$). Comments and engagement of child in activity also required PALS I and II. Intervention in both infancy and toddlerhood was most effective in terms of results. These PALS-prompted parent behaviors related to children using higher-level language responses, including more comments during the book-	Early and sustained responsive parenting intervention had the strongest impacts on mother-child reading behaviors. "Parenting programs will need to be adequately funded to span multiple developmental periods in order to maximize likelihood of effectiveness" (page 984, Authors).
LH		ANOVA			

Appendix Table A.1

Form of Parental Involvement	Citation	Age Group / Study Design	Type of Study / <i>N</i> (Number) / Sample	Cognitive/Socio-Emotional/Behavioral Outcome(s)	Overall / Other Results
				<p>reading task ($d = 0.23$) and children showing greater cooperation at posttest for PALS I, compared with non-PALS I students ($d = 0.92$). In addition, children born at term with mothers having PALS I and II interventions showed more engagement and enthusiasm about the shared reading activity than children in PALS I only ($d = 0.65$). Overall, however, children born with very low birth weight benefited as much as those born at term from their mothers' participation in the parenting intervention, with the most impactful results posted from intervention at both infancy and toddlerhood. Positive changes in child shared reading behaviors showed evidence of mediation by mothers' supportive behaviors.</p> <p>PALS home coaching program was designed as a preventive intervention to strengthen the parent/child bond and stimulate early language, cognitive, and social development. Curriculum is offered in 10- and 12-week sessions during first year of life and toddler/preschool, uses videotaped examples of real mothers and children to demonstrate different topics and allow mothers to critique these examples before practicing with children. Teaching included responding to a child's signals, building on a child's interests, and using rich language.</p>	
*Family provision of toys for literacy, verbal communication with child,	Mistry, R. S., Benner, A. D., Biesanz, J. C., and Clark, S. L. (2010). Family and social risk, and parental investments	PK Longitudinal Structural equation	Longitudinal study of cumulative risk with NELS (National Early Head Start [EHS])	Parental warmth and linguistic/literacy stimulation in PK (Home Observation for Measurement of the Environment [HOME]) were associated with higher levels of achievement and self-regulation and lower levels of poor social behavior. Language stimulation in PK, with PK achievement	Children's exposure to risk at infancy has negative effects on all school readiness skills. Warmth and literacy stimulation across

Appendix Table A.1

Form of Parental Involvement	Citation	Age Group / Study Design	Type of Study / N (Number) / Sample	Cognitive/Socio-Emotional/Behavioral Outcome(s)	Overall / Other Results
parental warmth and responsiveness LH, P	during the early childhood years as predictors of low-income children's school readiness outcomes. <i>Early Childhood Research Quarterly</i> , 25, 432-449.	modeling (SEM)	Research and Evaluation Project) N = 1,851 38% white, 33% African-American, 23% Latino, 5% other	($\beta = 0.15^{***}$), PK regulation ($\beta = .12^{***}$), and PK problem behavior ($\beta = -0.07^*$). Maternal warmth in PK, and PK achievement ($\beta = 0.11^{***}$), PK regulation ($\beta = 0.10^*$), and PK problem behavior ($\beta = -0.19^{***}$). PK achievement was looked at globally but included measures from Woodcock-Johnson, PPVT, CAP (Concepts About Print), math, reading vocabulary, book knowledge, and reading comprehension. Behavior assessed through Leiter International Performance Scale.	toddlerhood and PK are positively related with outcomes. These mediated some of the influence of cumulative risk in infancy on PK outcomes.
*Parental involvement at home and at school as well as perceived teacher responsiveness on social skills, behavior problems, math and reading LH, FIS	Powell, D. R., Son, S-H., File, N., and San Juan, R. R. (2010). Parent-school relationships and children's academic and social outcomes in public school pre-kindergarten. <i>Journal of School Psychology</i> , 48, 269-292.	PK Not longitudinal Hierarchical linear modeling (HLM)	N = 140 43% African-American, 36% European-American, 14% other	HLM analyses revealed that parental school involvement positively predicted children's social skills (Social Skills and Problem Behavior Scales of the Preschool [SSRS]) ($d = 0.55$) and math ($d = 0.36$) (Woodcock-Johnson Applied Problems) but negatively predicted problem behaviors ($d = -0.47$) (SSRS). Perceived teacher responsiveness to child/parent was positively related to early reading ($d = 0.43$) (WJLWI) and social skills ($d = 0.43$) but negatively to problem behaviors ($d = -0.61$). Parental involvement at home was unrelated to early reading, math, language (PPVT), social skills, and problem behaviors. No impact of PI at home or at school on the PPVT.	Parental involvement at school and teacher responsiveness were positively related to children's academic and social outcomes. Like the Galindo and Sheldon (2012) study, involvement at home did not prove to have positive associations with these outcomes.
Elaborative reminiscing and dialogic reading intervention	Reese, E., Leyva, D., Sparks, A., and Grolnick, W. (2010). Maternal elaborative	PK Longitudinal, intervention,	N = 33 Low-income Head Start 4-year-olds	Elaborative reminiscing had a significant, moderate effect size impact on children's narrative quality (F [(partial eta squared) $\eta_p^2 = 0.57$]) (means: elaborative = 6.9; dialogic = 1.75.; control = 4.71) and a small	This intervention study suggests support for teaching elaborative reminiscing to parents

Appendix Table A.1

Form of Parental Involvement	Citation	Age Group / Study Design	Type of Study / N (Number) / Sample	Cognitive/Socio-Emotional/Behavioral Outcome(s)	Overall / Other Results
study on narrative, vocabulary, print skills. LH	reminiscing increases low-income children's narrative skills relative to dialogic reading. <i>Early Education and Development</i> , 21(3), 318-342.	control group ANCOVA	and their mothers 36% Hispanic, 39% black, 25% white	effect on story comprehension ($\eta_p^2 = 0.24$) (means: elaborative = 3.41; dialogic = 1.67; control = 1.9), after controlling for covariates. Elaborative training did not have an effect on expressive vocabulary, story recall, or print skills. No positive effects for dialogic reading training on expressive vocabulary, narrative or print skills, after controlling for covariates. Another type of reading instructional strategy that may be effective in promoting early learning. Print skills assessed using CAP adaptation; narrative skills assessed using two narrative tasks; vocabulary skills from the PPVT-III (receptive); and Expressive Vocabulary Test (EVT) used to measure spoken lexical skills at both time points.	while pairing it with dialogic reading in PK classrooms. Need more studies to investigate quality of interactions in interventions.
Home literacy environment from birth to age 3 (children's participation in literacy activities, quality of mothers' engagements with children, provision of age-appropriate learning materials) LH	Rodriguez, E. T., Tamis-LeMonda, C. S., Spellmann, M. E., Pan, B. A., Raikes, H., Lugo-Gil, J., and Luze, G. (2009). The formative role of home literacy experiences across the first three years of life in children from low-income families. <i>Journal of Applied Developmental Psychology</i> , 30, 677-694.	PK (birth to age 3) Longitudinal Nested hierarchical multiple regression	N = 1,046 mothers of English-speaking children and home literacy experiences at 14, 24, and 36 months after the Early Head Start Research and Evaluation Project Over 1/3 teenage mothers, 43% white, 29% African-American, 24% Hispanic,	Hierarchical multiple regression revealed that quality of engagement (cognitive stimulation and sensitivity), literacy activities (participation in shared book reading, storytelling), and learning materials (books and toys) predicted children's language and cognitive skills over and above significant demographic predictors at 14, 24, and 36 months. The authors used the Bayley MDI, PPVT-III, and Infant and Toddler Short Forms of the MacArthur Communicative Development Inventories. For example, for the PPVT at 36 months, literacy activities ($\beta = 0.06^*$), maternal engagement ($\beta = 0.17^{***}$), and learning materials ($\beta = 0.14^{***}$). These were significant predictors above relevant background and predicted 20% of the variance in the PPVT. Similar significant results for Bayley and scores appeared at earlier ages. These factors alone	This study suggests the importance of multifaceted literacy experiences beginning as early as the first year of life. The home environment matters!

Appendix Table A.1

Form of Parental Involvement	Citation	Age Group / Study Design	Type of Study / N (Number) / Sample	Cognitive/Socio-Emotional/Behavioral Outcome(s)	Overall / Other Results
			53% receiving Head Start services	accounted for 4-8% of child outcomes at 14 months, 3-7% of variance at 24 months, and 6% of variance at 36 months, with the full models accounting for 6-10% at 14 months, 9-17% at 24 months, and 20% at 36 months. Children's literacy at the three ages jointly explained 6% and 7% of the variation in children's Bayley MDI and PPVT scores at 36 months, with the full models of each accounting for 27% of the variance in these outcomes.	
“Getting Ready” intervention seeks to strengthen parental warmth and sensitivity and improve parental competence in everyday parent-child interactions P	Sheridan, S. M., Knoche, L. L., Kuypzyk, K. A., Pope Edwards, C., and Marvin, C. A. (2011). A randomized trial examining the effects of parent engagement on early language and literacy: The Getting Ready intervention. <i>Journal of School Psychology, 49</i> , 361-383.	PK (followed 2 academic years) Longitudinal, randomized trial, control group Hierarchical linear modeling (HLM)	N = 217 children, 211 parents, 29 Head Start teachers in 21 schools 32% white, 18% black, 27% Latino, 3% Native American, 1% Asian, 19% other	Significant differences in favor of the treatment group over 2 academic years on teacher reports of children's language use ($d = 1.11$), reading ($d = 1.25$), and writing ($d = 0.93$) (Teacher Rating of Oral Language and Literacy [TROLL]). There were no differences across groups in expressive communication (Preschool Language Scale Expressive Communication). Intervention, on average, was a 60-minute home visit 8.3 times over 2 years in home with parent, child, and Head Start teacher.	Rate of growth was greater for children at a greater disadvantage due to developmental concern or language spoken. Intervention students made gains in summer when the control group did not. This suggests the power of the intervention to improve academic and social outcomes. Previous studies showed positive impact on reduced anxiety, improved initiative, and increased attachment with adults (Sheridan et al., 2010).
Father and	Tamis-LeMonda, C.	PK	N = 290	Composite measures of fathers' and mothers'	Importance of supportive

Appendix Table A.1

Form of Parental Involvement	Citation	Age Group / Study Design	Type of Study / N (Number) / Sample	Cognitive/Socio-Emotional/Behavioral Outcome(s)	Overall / Other Results
mother sensitivity, positive regard, cognitive stimulation (positive parenting), intrusiveness, negative regard, and detachment (negative parenting) on Bayley Scales at 24 and 36 months and on the PPVT at 36 months	S., Shannon, J. D., Cabrera, N. J., and Lamb, M. E. (2004). Fathers and mothers at play with their 2- and 3-year olds: Contributions to language and cognitive development. <i>Child Development, 75(6)</i> , 1806-1820.	2- and 3-year-old low-income children Longitudinal Regression analyses	<i>Mother and fathers:</i> 60% white, 20% black, 13% Latino, 30% of parents had 11 or fewer years of high school. All mothers received some form of government assistance.	supportive parenting (positive regard, cognitive stimulation, and sensitivity) were independently associated with children's Bayley MDI (memory, problem solving, classification, vocalization, language and social skills) and the PPVT (receptive vocabulary) scores even after considering association with education level and employment. Fathers' positive behaviors appear to benefit children directly. Negative parenting did not play a significant statistical role. For example, 36-month MDI predictive model, father's supportive parenting ($\beta = 0.25^{**}$), mother's supportive parenting ($\beta = 0.20^*$), mother's education not significant, father's education ($\beta = 0.18^*$). The model explains 28% of variance in MDI and is similar for the 36-month PPVT in significance except that mother's supportive parenting approaches significance. Father's education consistently predicted the quality of mother-child engagements.	parenting from both mothers and fathers in PK for receptive vocabulary and emergent literacy skills.
P					
*Opstap Opnieuw (Dutch version of HIPPY) preschool home learning intervention effects on quality of mother-child interaction — effects on social-	van Tuijl, C., and Leseman, P. P. M. (2004). Improving mother-child interaction in low-income Turkish-Dutch families: A study of mechanisms mediating improvements resulting from participating in a	PK 4- to 6-year-olds in home-based intervention program in the Netherlands Longitudinal, intervention, control group	N = 30 17 in program group, 13 in control group	This intervention study sought to examine the specific aspects of the interaction quality of the mother-child relationship that were affected by a preschool home learning intervention. The two areas studied included social-emotional support and cognitive distancing. These home activities included progressively more complex playful educational activities over 2 years; 150 planned activities were supported by paraprofessionals visiting families every 2 weeks. Mothers in the program group were more supportive than control group mothers ($F [1, 29] = 9.44, p = < 0.001$). Also, controlling for gender, for	This program contributed significantly to improving social-emotional support of mothers. The intervention could be strengthened by working on the cognitive distancing component of the program to reach further outcomes for students and families.

Appendix Table A.1

Form of Parental Involvement	Citation	Age Group / Study Design	Type of Study / N (Number) / Sample	Cognitive/Socio-Emotional/Behavioral Outcome(s)	Overall / Other Results
emotional support and cognitive distancing LH	home-based preschool intervention program. <i>Infant and Child Development</i> , 13, 323-340.	Regression/ correlations		pretest vocabulary and IQ, and for pretest support and distancing, the program group had significantly higher Turkish vocabulary ($F [1, 29] = 24.19, p < 0.01$) and pre-math skills assessed in Dutch ($F [1, 29] = 8.28, p < 0.01$ at posttest. No differences were found on cognitive distancing. Emotional support was positively related to vocabulary and pre-math skills, and distancing to vocabulary. Overall the effect of the program on literacy and math outcomes was partially mediated by interaction quality, namely, social-emotional support.	
Family literacy beliefs and home literacy practices and their relationship to children's print knowledge, interest in reading, and emergent writing. LH	Weigel, D. J., Martin, S. S., and Bennett, K. K. (2006). Mothers' literacy beliefs: Connections with the home literacy environment and pre-school children's literacy development. <i>Journal of Early Childhood Literacy</i> , 6, 191-211.	PK Longitudinal (over 1 year) Cluster analysis, multivariate logistic regression MANCOVA	$N = 79$ mothers and children over age 1 94% white, 3% Hispanic 8% had GED certificate; 35% completed high school and some college; 24% had college degree; 34% had graduate degree	Mothers with higher education and those with higher grades in school tended to be facilitative mothers. Also those who enjoyed reading and writing were more likely to be facilitative mothers than conventional mothers. Facilitative mothers were significantly more likely to spend more time in shared book reading ($\beta = 0.94^*$) and to be engaged in language activities ($\beta = 0.41^{**}$) than conventional mothers. Finally, in a repeated measures analysis, the authors found significantly more positive gains over the year in print knowledge ($F [3, 75] = 7.26^{**}$) and child reading interest ($F [3, 75] = 29.94^{***}$) for children of facilitative than conventional mothers. No differences were demonstrated across the groups in emergent writing. CELT (Children's Emergent Literacy Test) was used to measure literacy skills of print knowledge and emergent writing.	This research supports other research with differences in literacy beliefs by maternal education level. It is important for any and all intervention efforts to address family beliefs about literacy.

Appendix Table A.1

Studies of Prekindergarten and Above (7 Studies)

Form of Parental Involvement	Citation	Age Group / Study Design	Type of Study / <i>N</i> (Number) / Sample	Cognitive/Socio-Emotional/Behavioral Outcome(s)	Overall / Other Results
*Parental involvement from parents and teachers — frequency and quality of PI in child's education at home and at school (Parent Teacher Involvement Questionnaire)	El Nokali, N. E., Bachman, H. J., and Votruba-Drzal, E. (2010). Parent involvement and children's academic and social development in elementary school. <i>Child Development, 81</i> (3), 988-1005.	Assessments at PK and grades 1, 3, 5 Longitudinal Hierarchical linear modeling (HLM)	<i>N</i> = 1,364 National Institute of Child Health and Human Development study of Early Childcare and Youth Development 76% white, 13% black, 6% Hispanic, 5% other	HLM study indicated that within-child improvements in PI predicted declines in problem behaviors and improvements in social skills. Between-child analyses indicated that children of involved families had increased social functioning and fewer behavior issues. There were no associations with PI and increased achievement as measured on Woodcock-Johnson tests of vocabulary, letter-word identification, and math skills. Increases in teacher reports of PI were related to teacher- and mother-reported child social skills (SSRS) intercept (SE) = 6.56***, 2.58***. Increases in PI were negatively associated with teacher reports of behavior problems (Child Behavior Checklist CBCL), SE = -3.81***. Mother reports were similar to teacher reports.	Parental involvement at home and at school was positively associated with improved social skills and fewer behavior problems for children in the elementary grades. Possible reason for lack of association with grades was the global measure of achievement with a global measure of FI.
Level of parental involvement at school, mother-child problem solving, quality of interaction, parental expectations about schooling	Englund, M. M., Luckner, A. E., Whaley, G. J. L., and Egeland, B. (2004). Children's achievement in early elementary school: Longitudinal effects of parental involvement, expectations, and quality of assistance.	PK to grade 3 Longitudinal Path analysis	<i>N</i> = 187 Low-income firstborn children and mothers from Minnesota 66% white, 12% African-American, 19% mixed or minority	PK mother-child interactions had a significant direct effect on children's IQ ($\beta = 0.38$) and direct effects on achievement in grade 1 ($\beta = 0.18$). At grade 3, parental involvement (school-based involvement: Did teachers know parents? Did parents express concern about schoolwork, participate in conferences?) added significantly to predicting 3rd-grade achievement (teacher-rated achievement) after controlling for previous achievement ($\beta = 0.15$). Parental expectations at grade 1 ($\beta = 0.11$) and mothers' PK quality of instruction at 42 months ($\beta = 0.16$) had indirect effects on achievement at grade 3.	Overall, mother's instruction quality in PK, PI at school, and expectations influenced children's achievement in 3rd grade over and above mother's education, child IQ, and previous achievement.

Form of Parental Involvement	Citation	Age Group / Study Design	Type of Study / N (Number) / Sample	Cognitive/Socio-Emotional/Behavioral Outcome(s)	Overall / Other Results
	<i>Journal of Educational Psychology, 96(4), 723-730.</i>				
*Observations of typical home behavior of child-parent communication and learning to talk LH, P	Hart, B., and Risley, T. R. (2003). The early catastrophe. <i>Education Review, 17(1)</i> , 110-118.	PK 7-9 months through 3 years and tests at 9-10 years Longitudinal	N = 42	This intensive observational study involved an hour each month of families of children from 7 to 9 months through age 3. Of the 42 families, 13 were upper SES, 10 were middle SES, 13 were lower SES, and 6 were on welfare. Data indicated that children on welfare have half as much experience per hour (616 words per hour) as the average working-class child (1,251 words) and less than one-third that of the child in a professional family (2,153). The study also looked at the ratio of encouragements to discouragements, by SES, finding 166,000 encouragements to 26,000 discouragements for professional families; 62,000 encouragements to 36,000 discouragements for working-class families; and 26,000 encouragements to 57,000 discouragements for welfare families. Welfare families were more likely to provide discouragements, whereas professional families were more likely to provide encouragements. The rate of vocabulary growth at age 3 was strongly and positively associated with PPVT-R scores at age 9-10 (r = 0.58) and Test of Language Development 2 (TOLD) (r = 0.74). Vocabulary use at age 3 was associated with reading comprehension scores on the Comprehensive Test of Basic Skills (CTBS) (r = 0.56).	The study shows the number of hours of intervention needed to equalize children's early experience. It also points to the need for early and intense intervention for children most at risk.
Home literacy	Hood, M., Conlon, E.,	PK to grade 2	N = 143	Parental teaching was independently related to	Both reading and

Appendix Table A.1

Form of Parental Involvement	Citation	Age Group / Study Design	Type of Study / N (Number) / Sample	Cognitive/Socio-Emotional/Behavioral Outcome(s)	Overall / Other Results
practices (parent-child reading; parental teaching of letters, name, and words) on later vocabulary and phonological skills	and Andrews, G. (2008). Preschool home literacy practices and children's literacy development: A longitudinal analysis. <i>Journal of Educational Psychology, 100</i> (2), 252-271.	Longitudinal Hierarchical regression analyses	Caucasian Australian children	preschool letter-word identification scores ($R^2_{\text{change}} = 4.58\%$, $p = 0.008$). This mediated relationships with teaching and grades 1 and 2 letter-word identification, single-word reading and spelling rates, and phonological awareness. Parent-child reading was independently related to grade 1 vocabulary ($R^2_{\text{change}} = 5.6\%$, $p = 0.005$).	teaching are important factors related to children's literacy outcomes. Professional development for teachers and families should include both components for maximum success. This study provides additional support for the Sénéchal and LeFevre (2002) model.
LH					
*Study of the family experiences and involvement in K transition activities FIS	McIntyre, L. L., Eckert, T. L., Fiese, B. H., DiGennaro, F. D., and Wildenger, L. K. (2007). Transition to kindergarten: Family experiences and involvement. <i>Early Childhood Education Journal, 35</i> (1), 83-88.	PK to K Not longitudinal Chi-square analyses	N = 132 parents of children previously enrolled in early childhood education and transition to K 62% white, 22% black, 10% Hispanic, 6% other 40% reported government assistance	Concerns related to 74% attending a new school, 72% following directions at school, 55% behavior, 54% academics, 53% getting along with peers, 52% making needs known to others, 37% separation from family, 35% getting along with teacher Significant differences in type of involvement by whether or not families received government aid (55 received aid, and 75 did not): — Attend annual meetings at preschool: $X^2 = 9.22^{**}$ — Have monthly communication with preschool: $X^2 = 5.17^*$ — Visit K classroom: $X^2 = 6.71^*$ — Obtain information about K from books: $X^2 = 8.45^{**}$	Overall, families want to be involved in the K transition and need more information about how they best can support their children. Families receiving aid were significantly less likely than those not receiving aid to attend meetings at the preschool, have monthly communication with the preschool, visit a K classroom, and obtain K information from books and magazines. PK and K teachers would benefit from professional

Appendix Table A.1

Form of Parental Involvement	Citation	Age Group / Study Design	Type of Study / N (Number) / Sample	Cognitive/Socio-Emotional/Behavioral Outcome(s)	Overall / Other Results
Maternal-child conversations and sophisticated input during toy play, magnet play, mealtime, elephant book, and bear book LH	Weizman, Z. O., and Snow, C. E. (2001). Lexical input as related to children's vocabulary acquisition: Effects of sophisticated exposure and support for meaning. <i>Developmental Psychology</i> , 37(2), 265-279.	Maternal interactions at PK to K (age 5), PPVT at end of K and grade 2 Longitudinal Regression analyses	N = 53 low-income children attending Head Start or other preschool 75% white, 16% African-American, 7% Hispanic 40% single parents, 25% not finished high school	Vocabulary in K and 2nd grade related more to the occurrence of sophisticated lexical items than to the quantity of lexical input overall. Density of sophisticated words heard and density with which such words were embedded in helpful or instructive interactions at age 5 at home independently predicted over a third of the variance in children's vocabulary (PPVT-R) in K and 2nd grade. Density of instructive and helpful interactions, particularly during mealtime conversations, was strongly related to vocabulary scores in K ($r = 0.53$, $p = < 0.001$) and in 2nd grade ($r = 0.47$, $p = < 0.001$). Magnet play and toy play were also significant but less so, and the overall effect of the 5 settings was a correlation of about 0.52***. These two variables — with controls for maternal education, nonverbal IQ of child, and amount of child's talk produced during settings at age 5 — predicted 50% of the variance in children's 2nd-grade vocabulary. For 2nd grade, controlling for mother education, child nonverbal IQ and child word production, and exposure density accounted for significant prediction in PPVT 2nd-grade scores ($\beta = 1.36^{**}$). The full model explained 50% in children's 2nd-grade vocabulary.	This study emphasizes the importance of warm and instructive maternal-child interactions in K that are predictive of later receptive vocabulary in K and 2nd grade. Mealtimes and play often relate to high levels of instructive talk and should be included with book reading interactions as a way to foster positive literacy development in children.

Appendix Table A.1

Form of Parental Involvement	Citation	Age Group / Study Design	Type of Study / N (Number) / Sample	Cognitive/Socio-Emotional/Behavioral Outcome(s)	Overall / Other Results
*Effect of parental involvement and PK in a public school attendance on social skills, problem behaviors, and parent-teacher relationships	Wildenger, L. K., and McIntyre, L. L. (2012). Investigating the relation between kindergarten preparation and child socio-behavioral school outcomes. <i>Early Childhood Education Journal</i> , 40, 169-176.	PK to K Longitudinal Hierarchical regression analyses Early education experiences and preparation on socio-behavioral outcomes in K	86 general education students, their parents, and teachers 77% white, 11% black, 6% mixed, 2% Asian, 1% Latino 27% free or reduced-price lunch	Overall, public school pre-K attendance (preschool in public school building) had positive effects on social skills ($\beta = 0.16$), negatively related to problem behavior ($\beta = -0.34$), and positively related to student-teacher relationships ($\beta = 0.35$). Total family involvement in K transitions was unrelated to social skills, problem behavior, and student-teacher relationships.	This study focuses on the positive relationship of attendance in PK in public school and socio-behavioral outcomes like social skills, student-teacher relationships, and problem behavior. Family involvement was unrelated to these outcomes, and perhaps it may be more important with at-risk populations or may relate to different outcomes than those measured here.

Appendix Table A.1

Studies of Kindergarten (9 studies)

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
Effects of parental involvement (PI) at home and at school on K literacy as well as predictive factors of Latino children's home and school involvement	Durand, T. M. (2011). Latino parental involvement in kindergarten: Findings from the Early Childhood Longitudinal Study. <i>Hispanic Journal of Behavioral Sciences</i> , 33, 469-489.	K Longitudinal Regression analyses Involvement measures in fall and spring of K	N = 2,051 Lowest SES (35%), 2nd quintile (25%), 3rd quintile (19%), 4th quintile (15%), 5th quintile (7%)	Overall PI (at home and at school) was positively predictive of children's literacy skills ($\beta = 0.11^{**}$), as was maternal education ($\beta = 0.18^{***}$), income ($\beta = 0.10^{**}$), child age ($\beta = 0.13^{***}$), and gender ($\beta = 0.11^{***}$). Predictors of home involvement included maternal education ($\beta = 0.19^{***}$), acculturation (parents' nativity and children's home language) ($\beta = 0.19^{***}$), and social capital ($\beta = 0.18^{***}$). This explained 14% of variance in home involvement. Predictors of school involvement included income ($\beta = 0.13^{**}$), maternal education ($\beta = 0.14^{**}$), acculturation ($\beta = 0.16^{***}$), any language barrier ($\beta = -0.06^*$), teacher outreach ($\beta = 0.11^{**}$), meeting time ($\beta = -0.15^{***}$), and social capital ($\beta = 0.25^{***}$). This explained 26% of the variance. ECLS-K reading assessment measures of early literacy skills included print familiarity, letter recognition, identifying beginning and ending sounds, word reading, vocabulary, and reading comprehension. PI measure was a global measure of PI at home and at school. PI at home included reading, telling stories, singing songs, doing chores. School involvement included conferences, open house, PTA meetings, advisory groups, volunteering, fund-raising, and attending class events.	Overall, PI was positively related to Latino children's literacy, and school involvement was related to social capital and teacher outreach. Social capital also predicted home literacy activities.
*K transition practices of a	Early, D. M., Pianta, R. C., Taylor, L. C.,	K	N = 3,595 K teachers	Most common practices were class as a whole after school starts (65%), practices as a whole before	Training in transitions, primary certification,

Appendix Table A.1

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
large sample of teachers FIS	and Cox, M. J. (2001). Transition practices: Findings from a national survey of kindergarten teachers. <i>Early Childhood Education Journal</i> , 28(3), 199-206.	Not longitudinal t-tests and correlations	80% white, 7% black, 5% Hispanic, 1% Asian, 6% mixed	school starts (59%), individualized practices after school starts (44%), coordination with preschool (36%), and individualized practices before school starts (29%). Teachers of larger classes use fewer individualized and group practices before school begins. Teachers with primary certification were more likely than those without to use individualized practices before and after school starts. Also, teachers who received class lists earlier reported using more transition practices before the school year starts ($r [3400] = 0.06, p < 0.01$), for those aimed at individual child/family and for those aimed at the whole class, and fewer transition practices after the beginning of the school year. Teachers with training in transitions reported significantly more practices in all areas than teachers without training in transitions. Finally, white teachers were more likely to use both group and individualized practices before the beginning of the school year than either black or Hispanic teachers.	generation of class lists, and smaller classes were all factors that positively influenced the use of more and individualized practices in the move of children from PK to K.
Dialogic reading in PK (asking questions, providing feedback, developing concepts about rhyme) LH	Fielding-Barnsley, R., and Purdie, N. (2003). Early intervention in the home for children at risk of reading failure. <i>Support for Learning</i> , 18, 77-82.	K Longitudinal, intervention, control group ANOVA Time 1:	N = 49 26 in treatment group, 23 in control group	Study of an 8-week dialogic reading intervention. Dialogic reading involves reading <i>with</i> children (rather than <i>to</i> them), asking questions, providing feedback, and developing concepts about print knowledge and rhyme. The trained researcher brought picture books and videotaped instruction to the home demonstrating best practice in dialogic reading. Six domains were addressed: PPVT, initial consonant, final consonant, rhyme, CAP, and	Dialogic reading seems to be a beneficial intervention for at-risk children before formal schooling. Results of intervention lasted over a year later. Compared with children in the control group, children in the intervention group

Appendix Table A.1

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
		February, before reading instruction Time 2: November		alphabet-RISCA. The intervention successfully improved pre-reading skills of the intervention group at Time 1, with significantly higher scores on 4 of 6 domains (PPVT, initial consonant, rhyme, and CAP). Both groups improved over time, but there was significant improvement of the intervention group over the control group on final consonant, as measured by the PPVT (means: intervention group = 88.69; control group = 81.65) and CAP (Concepts About Print means: intervention group =17.04; control group = 14.52) at Time 2. Spelling and reading (word identification) were also better for the intervention group (spelling: 39.73; reading: 14.96) than for the control group (spelling: 26.17; reading: 6.70).	were advanced in specific skills as well as in tests of reading and spelling.
*Family involvement at school, involvement at home, educational expectations, and school outreach efforts FIS, LH, P	Galindo, C., and Sheldon, S. B. (2012). School and home connections and children's kindergarten achievement gains: The mediating role of family involvement. <i>Early Childhood Research Quarterly</i> , 27, 90-103.	K Longitudinal Hierarchical linear modeling (HLM)	N = 16,425 children from Early Childhood Longitudinal Study-Kindergarten (ECLS-K) 57% white, 17% black, 19% Latino, 3% Asian, 4% other 64% two-parent families,	After controlling for family and student background variables, HLM regression analyses indicated that schools that made more efforts to engage families tended to have parents reporting higher levels of involvement at school but not higher involvement at home or higher educational expectations. Each unit increase on school outreach was associated with a 0.02 point increase of family involvement in school activities. Students whose parents were more involved at school or who had higher educational expectations demonstrated greater gains in reading and math at the end of kindergarten. Each unit increase in family involvement in school was associated with a 1.10 and 0.97 point increase in math and reading, respectively. When involvement at school,	School outreach, family involvement at school, and educational expectations positively related to levels of family involvement and gains in reading and math, even after controlling for previous achievement. Lack of findings with involvement at home (Fan and Chen, 2001; Fantuzzo et al., 2004) may have to do with how the concept was

Appendix Table A.1

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
			13% non-English-speaking homes	involvement at home, educational expectations, school outreach, and other relevant variables were included in the reading model, school outreach ($b = 0.38^*$), involvement at school ($b = 0.74^{**}$), and educational expectations ($b = 0.19^{**}$) all posted significant and positive associations with kindergarten reading. Involvement at home failed to demonstrate significant associations. Math and reading measures came from ECLS-K. Involvement at home was unrelated to math and reading gains.	measured and the related outcome. Home involvement was measured as a basic set of activities, rather than focusing on the quality or nature of the experience or interactions.
*Investigation of teachers' beliefs about K children's print knowledge and their beliefs about parent involvement in the process, by SES FIS	Lynch, J. (2010). Kindergarten teachers' beliefs about students' knowledge of print literacy and parental involvement in children's print literacy development. <i>Alberta Journal of Educational Research</i> , 56(2), 157-171.	K Longitudinal measures — beginning/end-of-year measures of children's literacy knowledge: sounds of letters, read from top to bottom, capital letter t-tests	$N = 72$ teachers in a large city in Canada	Significant differences at the beginning and the end of the year in children's print knowledge were found, by SES, in sounds of alphabetic letters, reading from top to bottom, and identifying a capital letter. In addition, teachers significantly differed in their beliefs about PI in knowledge of literacy activities ($t [38] = 3.10; p < 0.01$); interest in children's literacy ($t [38] = 2.08; p < 0.05$), engagement with writing activities ($t [35] = 2.49; p < 0.05$), and story reading ($t [36] = 3.18; p < 0.01$), by higher and lower SES. However, overall, no significant differences in teachers' beliefs about PI, by SES, just within certain activities. Print knowledge and beliefs were measured using an author-created instrument based on CAP and The Kindergarten Program-Revised (Ontario Ministry of Education, 2006).	Preservice and inservice teachers should have opportunities to examine and reflect on research on diverse types of literacy events occurring in all families and address stereotypes about parent involvement. We must strengthen teacher beliefs about how to involve parents in literacy development with undergraduate teacher education programs where there is little focus on involvement of parents.
*Supportive	McWayne, C.,	K	$N = 307$	Correlations between supportive home learning	Overall, it is helpful to

Appendix Table A.1

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
home learning environment, direct school contact, inhibited involvement on academic and social and play competencies of ethnic-minority, low-income K children LH, FIS	Hampton, V., Fantuzzo, J., Cohen, H. L., and Sekino, Y. (2004). A multivariate examination of parent involvement and the social and academic competencies of urban kindergarten children. <i>Psychology in the Schools, 41(3)</i> , 363-377.	Not longitudinal Correlations	95% African-American, 61% attended Head Start	<p>environment were associated with general social skills (SSRS-P) like cooperation ($r = 0.41^{***}$), responsibility ($r = 0.29^{***}$), self-control ($r = 0.28^{***}$), and assertion ($r = 0.25^{***}$). It was negatively related to hyperactivity ($r = -0.16^*$). Dimensions of Home-Based Peer Play (PIPPS-P) also related to supportive home learning environment, like play interaction ($r = 0.31^{**}$), and negatively with play disconnection ($r = -0.18$). Similar relations were found with School-Based Peer Play (PIPPS-T).</p> <p>Supportive home learning environment also related to reading ($r = 0.19^*$) (SSRS-teacher rating of reading and math) and math ($r = 0.19^*$), motivation ($r = 0.26$) (SSRS-T) and intellectual ability ($r = 0.17^*$).</p> <p>Direct school contact was associated with general social skills and play interaction, and inhibited involvement was most strongly associated with hyperactivity and with externalizing and internalizing problems.</p> <p>Involved families were most likely to provide a rich learning environment, and disconnected families had less direct school contact and more inhibited involvement. Involved families had children with higher levels of cooperation, self-control, and responsibility, while disconnected families had children with more internalizing and externalizing problems and hyperactivity.</p>	conceptualize PI in the early years with home, school, and warmth dimensions. Specifically, home involvement dimensions were correlated with academic <i>and</i> social competencies of children, while direct school contact and inhibited involvement related more to social skills, lower academics, and reading abilities.
*Parenting investment and	Raver, C. C., Gershoff, E. T., and	K	21,255 children from the Early	Authors use SEM to look at the mediating role of parental investment (purchase of cognitively	For white students, income's effects on

Appendix Table A.1

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
positive parenting behavior P, C	Aber, J. L. (2007). Testing equivalence of mediating models of income, parenting, and school readiness for white, black, and Hispanic children in a national sample. <i>Child Development, 78(1)</i> , 96-115.	Longitudinal Structural equation modeling (SEM)	Childhood Longitudinal Study-Kindergarten (ECLS-K) cohort: specific patterns for white, black, and Hispanic children 55% white, 18% Hispanic, 15% black, 6% Asian, 2% Native American 75% two-parent families	stimulating materials, parental activities outside home, extracurricular activities outside home, parents' report of involvement at school, stress) and positive parenting (parental warmth, cognitive stimulation, use of physical punishment, rules and routines) to income and hardship and cognitive and social-emotional competence. Cognitive skills included PPVT-3, Woodcock-Johnson reading, math, and general knowledge subtests. Social-emotional competence was measured using the Social Skills Rating Scale (SSRS). Children's cognitive and social skills were examined globally. Clear evidence that low family income covaries with lower parental investment and lower cognitive competence for white and ethnic children. Parental investment does mediate the role of income on outcomes. Positive parenting behavior was positively and significantly related to child social-emotional competence for white (unstandardized $b = 1.93$), for black (unstandardized $b = 1.31$), and for Hispanic students (unstandardized $b = 1.99$). Parent investment influenced child cognitive outcomes and mediated effects for family income for black and Hispanic students. Parent investment and cognitive skills for white students (unstandardized $\beta = 6.45$), for black students (unstandardized $\beta = 3.98$), and for Hispanic students (unstandardized $\beta = 5.20$).	outcomes is mediated by parental processes. For black and white students, the effect is partially mediated. It is important to look at subgroup differences when policy and intervention practices are in play. On the whole, there were many similarities in models across these subgroups (reading, math, general knowledge, school readiness; internalizing and externalizing behavior constructs seem to measure appropriate things), though there were differences by ethnic group in physical punishment, warmth, and rules.
*Early maternal sensitivity, teachers' reports	Rimm-Kaufman, S. E., Pianta, R. C., Cox, M. J., and Bradley, R.	K Longitudinal	$N = 223$ NICHD study of	Family involvement as measured by attitudes was significantly and positively associated with 8 of 9 social and academic outcomes, including language (β	As noted by Christenson, "family-school collaboration is an

Appendix Table A.1

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
of FI in school (attitudes toward school and activities with school) P, FIS	H. (2003). Teacher-rated family involvement and children's social and academic outcomes in kindergarten. <i>Early Education and Development, 14</i> (2), 179-198.	Two-step logistic regression	Early Child Care (from NC, VA, AR) 85% European-American, 12% African-American,	= 0.24; p < 0.05) and math ($\beta = 0.27$; p < 0.05). However, family involvement activities were significantly associated with only 2 of 9 outcomes — and, with behavior problems, a significant and positive association emerged ($\beta = 0.24^*$), meaning that increased family involvement related to more student behavior problems. Family involvement activities did relate positively to higher language outcomes ($\beta = 0.22$; p < 0.05). Higher maternal sensitivity related to fewer behavior problems ($\beta = -0.23$). Higher SES ($\beta = 0.19, 0.18$) and sensitivity ($\beta = 0.27, 0.29$) predicted higher language and math scores. Overall, however, the majority of outcomes were positive, especially for family attitudes, and both attitudes and activities related positively to student language outcomes. Maternal sensitivity at 36 months: Videotapes of three box task with toys and coders assessed mother's supportive presence, respect for child's autonomy, stimulation of cognitive development, hostility, and confidence.	attitude, not merely an activity.” Families whose attitudes are in alignment with school, regardless of their at-school involvement, may convey messages that promote school success.
*Kindergarten transition practices and parent-initiated involvement at school during K FIS	Schulting, A. B., Malone, P. S., and Dodge, K. A. (2005). The effect of school-based transition policies and practices on child academic outcomes. <i>Developmental Psychology, 41</i> (6),	K Longitudinal Three-level Hierarchical linear modeling (HLM)	N = 17,212 children from Early Childhood Longitudinal Study-Kindergarten (ECLS-K) sample 57% white, 14% black, 17% Hispanic,	HLM demonstrated that the number of school-based transition practices in fall of K was associated with more positive academic achievement scores at end of K, controlling for SES and other demographic traits. The effects of transition practices were stronger for low- and middle-SES children than for high-SES children. Specifically: Parent-initiated school involvement significantly predicted academic achievement ($\beta = 0.89^{***}$) measured by a composite score of reading, math, and	Schools should use transition practices to help children and families in K. In fact, fewer transition practices are used in low-SES schools — the schools that benefit most from such practices. Transitions' effects on

Appendix Table A.1

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
	860-871.		6% Asian	<p>general knowledge, as obtained from ECLS-K.</p> <p>School-level transition practices significantly predicted academic achievement at the end of K ($\beta = 0.51$; $p < 0.0001$).</p> <p>School-level transition practices significantly predicted school involvement ($\beta = 0.08$; $p = 0.0001$). Children of average SES or 1 standard deviation below the mean of SES experienced the largest gains in parent-initiated school involvement for each additional transition activity.</p> <p>The practice of children and parents visiting the K classroom before school started demonstrated a significant main effect on achievement ($\beta = 1.26$; $p = 0.009$). This also interacted with SES, with the effect of making the transition greatest for low-SES students.</p> <p>K transition practices had a positive effect on parent-initiated school involvement, and this mediated the effect of transition practices on achievement. Teacher-initiated PI was negatively associated with child outcomes. Practices included information about K sent or phoned to parents, PK spend time in K classes, school day short at beginning of the year, parents and children visit before school starts, teacher visits homes, parents attend orientation, and other.</p>	achievement were partially mediated by parent-initiated involvement at school, suggesting the possibility of transitions in encouraging higher levels of PI.

Appendix Table A.1

Studies of Kindergarten and Above (8 Studies)

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
Parental role strain, parental warmth, involvement at school, home literacy C	Aikens, N. L., and Barbarin, O. (2008). Socioeconomic differences in reading trajectories: The contribution of family, neighborhood, and school contexts. <i>Journal of Educational Psychology, 100(2)</i> , 235-251.	K to grade 3 Longitudinal Hierarchical linear modeling (HLM) Growth curve models	10,998 children from the Early Childhood Longitudinal Study-Kindergarten (ECLS-K) cohort 58% white, 16% black, 19% Hispanic, 4% Asian 21% below poverty line	Family context (home literacy environment, PI in school, and parental role strain) best accounts for SES disparities in children’s initial reading achievement as they enter school. Schools and neighborhoods, however, contributed more than family characteristics to SES differences in learning rates in reading. Much of the gap is still unexplained by models. The number of children reading below grade and the presence of low-income peers were consistently associated with initial achievement and growth rates.	Analyses suggest a compounding effect of low-quality environments. “No one solution or efforts targeted to any single context will ameliorate the reading achievement gap. Those involved in policy and intervention must recognize the ecological, dynamic nature of development and functioning. Children’s development is multi-determined and embedded in dynamic, interconnected systems” (Aikens and Barbarin, 2008, p. 250).
“Concerted cultivation” (CC) examination: parenting practices, including child activities; parental	Cheadle, J. E. (2008). Educational investment, family context, and children’s math and reading growth from kindergarten through the third grade. <i>Sociology of</i>	K to grade 3 Longitudinal HLM	Over 14,000 children in the Early Childhood Longitudinal Study (K class) Reading: 14,544 Math: 14, 579	Concerted cultivation includes a child’s activities (participated in dance athletic clubs, music, art, or performing art); parental involvement at school; number of children’s books in home. CC played a significant and positive predictive role of children’s reading skills at K entry. Educational investments are an important mediator of SES and racial/ethnic disparities in skills, completely explaining the black-white reading gap at K entry and consistently	These parenting practices and activities and involvement at school helped partially to explain some differences in black-white and Hispanic-white achievement gaps, after controlling for SES.

Appendix Table A.1

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
involvement at school; number of children's books in home	<i>Education, 81(1)</i> , 1-31.		60% white, 13% black, 17% Hispanic, 5% Asian	explaining 20-60% and 30-50% of the black-white and Hispanic-white disparities in growth parameters, respectively. Though not over the summer, it remains a statistically significant predictor of reading growth during the school year. For math, CC played a significant role in initial status through K and summer. It does not play a role beyond that in grades 1 to 3. CC relates to important early academic advantages. It is only a partial explanation for SES advantages. It related to black-white and Hispanic-white gaps, after controlling for SES. Black and Hispanic children had lower levels of CC.	Black and Hispanic students tended to have lower levels of CC than white students. This suggests that the practice plays a more significant role than Lareau (2002) thought.
C					
Parenting behavior (cultural activities, cognitively stimulating materials, organized activities, home learning activities, school-based PI, physical discipline, routines, family adjustment, hardship, socialization)	Crosnoe, R., and Cooper, C. E. (2010). Economically disadvantaged children's transitions into elementary school: Linking family processes, school contexts, and educational policy. <i>American Educational Research Journal</i> , 47(2), 258-291.	Fall of K through spring of grade 1 Longitudinal Multilevel models	N = 17,401 from Early Childhood Longitudinal Study-Kindergarten (ECLS-K) cohort 57% white, 14% African-American, 6% Asian, 17% Latino, 5% other	Children had smaller gains on math and reading tests between K and 1st grade with each additional marker of family economic disadvantage (especially when a third disadvantage was added to the pair of parent education and poverty). Different aspects of PI mattered more for math than for reading. For math and reading, cognitively stimulating materials impacted achievement. For reading, cognitively stimulating materials ($\beta = 0.06$; $p < 0.001$) had a significant effect. While school-based PI mattered for math ($\beta = 0.03$; $p < 0.01$), it did not impact reading. Rules and routines mattered for reading ($\beta = 0.04$; $p < 0.001$). Both math and reading were positively impacted by organized activities and negatively impacted by the child's problems with internalizing ($\beta = -0.05$; $p < 0.001$) and externalizing ($\beta = -0.07$; $p < 0.001$). An interesting effect was grade tenure as being positively	Examines many child, family, and school dynamics in K and their relationship to math and reading achievement. Practical implications include the importance of retaining K teachers in grade for its relationship to reading achievement and the need for more mental health services for children at risk at this age and for their families.

Appendix Table A.1

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
LH, P, FIS				associated with reading achievement ($\beta = 0.03$; $p = < 0.05$). Math and reading assessments were from the ECLS-K.	
Family involvement at school (attending conferences, PTA, open houses, helping in class or on field trips, and so on)	Dearing, E., Kreider, H., Simpkins, S., and Weiss, H. B. (2006). Family involvement in school and low-income children's literacy performance: Longitudinal associations between and within families. <i>Journal of Educational Psychology</i> , 98, 653-664.	K to grade 5 Longitudinal Latent growth models Literacy at K and grades 3, 5	N = 281 children from Comprehensive Child Development Program (CCDP) and School Transition Study (STS) Low-income children 36% African-American 21% Latino	Children whose families increased FI over time had larger gains in literacy achievement (Woodcock-Johnson Letter-Word Identification [WJLWI] subtest) after kindergarten than children whose families were stable or decreased FI over time. The effect size for this association ($pr = 0.23$) was the second largest; only K literacy performance was higher ($pr = 0.38$). Average FI was positively associated with average literacy performance for children of less educated mothers.	Increased family involvement in school from K through grade 5 had stronger implications for children's literacy than family income, maternal education level, or child's race/ethnicity. High levels of family involvement were most beneficial for children of mothers with less education.
Mother-child interactions in kindergarten (supportive presence, quality of instruction, respect for autonomy) and their association with grade point average (GPA)	Gregory, A., and Rimm-Kaufman, S. (2008). Positive mother-child interactions in kindergarten: Predictors of school success in high school. <i>School Psychology Review</i> , 37(4), 499-515.	K effects on high school graduation and academic achievement Longitudinal Logistic regression model	N = 142 60% white, 40% African-American Education level = 3.6 on a scale of 1 to 6	In a logistic regression model, a child with one unit higher mother-child interaction score was 3.54 times more likely to graduate successfully from high school. This was the highest of all variables, including maternal education, race/ethnicity, gender, and IQ. Maternal education and higher IQ in K were positively associated with higher scores in reading and math. Quality of mother-child interactions was a nonsignificant predictor of GPA for children of white, educated mothers. However, for children of African-American mothers who had not graduated from high	Graduation rates were higher for all groups of students having supportive mother-child interactions (promotive effect). Protective effects for mother-child interactions on GPA occurred for African-American children whose mothers had

Appendix Table A.1

Form of Parental Involvement and graduation rates	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
P				school, the quality of mother-child interactions predicted GPA. Taking into account gender, maternal education, and IQ, the coefficient for mother-child interaction was significant in the African-American sample ($\beta = 0.44$; $p < 0.05$).	lower education. These early interactions may help promote children's emotion regulation, and/or this success in sensitivity relates to later success in helping children academically throughout their education.
Formal and informal home print / literacy activities (storybook reading, teaching reading, and writing words)	Sénéchal, M., and LeFevre, J. (2002). Parental involvement in the development of children's reading skills: A five-year longitudinal study. <i>Child Development</i> , 73(2), 445-460.	K and grade 1, followed through grade 3 Longitudinal Hierarchical regression	Two cohorts from K (N = 110) and one cohort from grade 1 (N = 58) Most from English-speaking homes of white families in Ottawa, Ontario, Canada	Children's exposure to books related positively to the development of vocabulary and listening comprehension skills. These skills directly related to children's grade 3 reading. Parental involvement in teaching about reading and writing related to early literacy skills, and these predicted word reading at end of grade 1 and indirectly predicted reading at grade 3. Authors used hierarchical regression techniques. Receptive language was measured from vocabulary using the Peabody Picture Vocabulary Test-Revised (PPVT-R), and listening comprehension was measured by listening to stories from the Stanford Early School Achievement Test (SESAT). Phonological awareness was measured using a sound categorization task from SESAT. Emergent literacy from CAP (Concepts About Print), alphabet knowledge (label 10 uppercase and 4 lowercase letters), invented spelling (print 10 words), decoding (read 5 consonant-vowel-consonant words).	Clear support for the importance of family reading and teaching of reading to different aspects of literacy, grade 1 skills and grade 3 skills. Early home literacy experiences indirectly relate to reading in grade 3.
LH					
Educational and	St. Clair, L., Jackson,	K and grades 1,	N = 42 end of	Parents participated in an average of 50% of the 25	This study suggests the

Appendix Table A.1

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
networking sessions with parents and resource materials for home checkout (Leap Pads, PlayStation reading and math games, Leap desks, books)	B., and Zweiback, R. (2012). Six years later: Effect of family involvement training on the language skills of children from migrant families. <i>School Community Journal, 22(1)</i> , 9-19.	5, 6 Longitudinal, intervention, control group	grade 1 N= 33 end of grade 5/6 97% Hispanic	hour-long sessions offered in K year, with a range of 8-25 sessions. Content included information from child's K curriculum (such as letter of the week, literacy skills, sight words). Modeled ways of supporting children and also provided resource materials (PlayStation with Lightspan Achieve Now software to be played, Leap Pads, Leap Desks, and books). Broad differences in grade 1 on Woodcock-Muñoz Language Survey: control group = -1.83; treatment group = 4.68 (F [1, 41] = 9.59; p = < 0.005). In grade 5/6, significant positive differences, again in favor of treatment group (n=33), on the Nebraska State Reading Assessment: control group = 69.3; treatment group = 92.5.	positive impact of culturally sensitive parent training / networking sessions for long-term reading outcomes for Hispanic migrant children. By late elementary school, control group students were not meeting standards, while the treatment group did "meet standards."
LH		ANOVA			
*Family involvement in school-based activities (attend conferences, PTA or PTO meetings, open houses)	Tang, S., Dearing, E., Weiss, H. B. (2012). Spanish-speaking Mexican-American families' involvement in school-based activities and their children's literacy: The implications of having teachers who speak Spanish and English. <i>Early Childhood Research Quarterly, 27</i> , 177-187.	K to grade 3 Longitudinal Cross-lagged path analysis, random intercept regression, and ordinary least squares (OLS) regression	N= 72 low-income Spanish-speaking Mexican-American families	Rate of increase of family involvement between K and grade 1 was greater for children who consistently had bilingual teachers than for those who did not. Increased family involvement related positively to literacy skills at grade 3, especially for strugglers. For example, families with children who had low K literacy scores (WJLWI) but who consistently attended classes with Spanish-English teachers displayed significant increases in involvement between K and grade 3 (b = 0.061; p = 0.01). For those with relatively low achievement at kindergarten, an increase of 1 SD in involvement (that is, an additional 1.60 school involvement activities) predicted 47% of an SD increase in grade 3 literacy scores (b = 0.28; p = 0.002).	This study demonstrates the power of increasing the number of elementary school teachers who are fluent in Spanish and English for Spanish-speaking elementary students' literacy outcomes and levels of family involvement.
FIS					

Appendix Table A.1

Studies of First Grade and Above (3 Studies)

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
*Parenting intervention involving inquiry and teaching parents and teachers to use questions to help children become the teller or reader of the book and relating book to ideas out of life	Powell, D. R., and Peet, S. H. (2008). Development and outcomes of a community-based intervention to improve parents' use of inquiry in informal learning contexts. <i>Journal of Applied Developmental Psychology</i> , 29, 259-273.	Grades 1 to 4 Longitudinal, intervention, control group ANCOVA	N = 128 47% white, 26% black, 20% Latino, 5% other 16% less than high school education, 66% some postsecondary education	Positive effect of the intervention with significant program/control group differences (10 sessions of 90 minutes each) on child involvement in daily routines (F [1, 126] = 5.69; p = 0.04), conversations with the child (F [1, 127] = 2.28; p = 0.01), and school performance influences (F [1, 127] = 6.41; p = 0.01). Sessions featured topics concerning children's futures, family-school relations, extracurricular activities, libraries, and parental expectations of children.	This iterative program development strategy resulted in positive effects for program participants over control group students in terms of conversations with children, involvement in daily routines, and rating of school performance indicators.
P					
PI program for early literacy called "Words to Go" — home literacy activities LH	Reutzel, D. R., Fawson, P. C., and Smith, J. A. (2006). Words to go: Evaluating a first grade parental involvement program for "making" words at home. <i>Research and Instruction</i> , 45, 119-159.	Grade 1 Longitudinal, intervention, control group ANOVA	N = 144 (67 in Words to Go, 77 in matched schools with phonics but not Words to Go) 35% diversity (black, Asian, Hispanic) 50% free/reduced-price lunch	Results of the intervention indicated positive results for word reading (F [1, 141] = 35.4; p = < 0.0001 — large effect size), word writing (F [1, 141] = 40.1 — large effect size; p = < .0001), and end-of level test in language arts (F [1,141] = 36.2; p = < 0.0001 — moderate-to-large effect size). Words to Go was used weekly for one school year. There were 3 parent training sessions at the beginning of the year, and only 65% of parents attended one.	This study demonstrated effective achievement results of a program to help parents engage their children in phonics at home in ways similar to the ways that they are taught in school.
Family literacy	Saint-Laurent, L., and	Grade 1	N = 108	Students in the literacy program demonstrated	This study supports the

Appendix Table A.1

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
program for 1st-graders (book reading with parents adapting PI to increasing skill; support for writing, enjoyable home activities complementing teaching)	Giasson, J. (2005). Effects of a family literacy program adapting parental intervention to first graders' evolution of reading and writing abilities. <i>Journal of Early Childhood Literacy</i> , 5, 253-278.	Longitudinal, intervention, control group ANOVA	(53 in workshops, 55 in control group) 96% Caucasian students from French-speaking homes in Montreal and Quebec City	significantly higher levels of sentence structure, vocabulary, spelling, and length of text. They also performed significantly better on the reading (F [1, 107] = 7.61; p = < 0.01) and writing tests (F [1, 107] = 14.13; p = < 0.001). Treatment was for 1 year and involved 9 workshops, lasting 90 minutes, on topics of book reading and school success, book reading even in grade 1, library visit, playing with letters, functional reading and writing, writing plays, and so on.	importance of interventions with both writing and reading elements and the utility of programs that adapt with children's changing knowledge.

LH

Meta-Analyses, 2001-2012 (8 Studies)

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
Aspirations, communications, home supervision, participation at school C	Fan, X., and Chen, M. (2001). Parental involvement in students' academic achievement: A meta-analysis. <i>Educational Psychology Review</i> , 13(1), 1-21.	Various ages Effect sizes	Meta-analysis of 25 studies representing over 130,000 students	Positive relationship between PI and academic achievement ($r = +0.25$). Lower relationships with math ($r = 0.18$) and reading ($r = 0.18$). Specific types of involvement had more significant relationships than others. For example: Aspirations for education, $r = 0.39$ Communication, $r = 0.19$ Supervision, $r = 0.09$ Participation, $r = 0.32$ Strongest effects resulted when GPA (or a global	Specific types of family involvement have different relationships to different outcomes. In this study, aspirations for education had the strongest relationship with achievement, while supervision (for example, rules about TV viewing) had the weakest relationship.

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome achievement measure) was used, rather than a subject-specific measure.	Overall / Other Results
Shared reading programs, partnership programs, homework checking, communication between parents and teachers, Head Start, English as a Second Language (ESL)	Jeynes, W. (2012). A meta-analysis of the efficacy of different types of parental involvement programs for urban students. <i>Urban Education</i> , 47(4), 706-742.	PK to grade 12 Effect sizes	Meta-analysis of 51 studies between 1964 and 2006	Results demonstrated many positive results for different forms of PI and overall achievement. For example: Overall achievement and PI, $d = 0.30^{**}$ Younger students, $d = 0.29^{**}$ Shared reading, $d = 0.51^{**}$ Partnership programs, $d = 0.35^{*}$ Homework check, $d = 0.27^{*}$ Communication between parents and teachers, $d = 0.28^{*}$ ESL and Head Start and ESL, $d = 0.22$ (not significant)	Significant and positive evidence for the efficacy of family involvement programs relating to positive achievement; notably, shared reading and partnership programs were the strongest forms.
LH, FIS					
Parenting programs, parent home learning, communicating, volunteering, community support	Mattingly, D. J., Prislin, R., McKenzie, T. L., Rodriguez, J. L., and Kayzar, B. (2002). Evaluating evaluations: The case of parent involvement programs. <i>Review of Educational Research</i> , 72, 549-576.	K to grade12 PI programs	Review of 41 studies At least half the studies are longitudinal.	The analysis did not suggest that PI programs are an effective means of improving student achievement. However, the authors' table summarizing results for literacy-related programs indicates that about 75% of them (21 of 28) had some benefits for students and/or parents in literacy-related outcomes or behaviors. Most programs were multidimensional and included an average of 3.4 intervention components. Most included help for parents to support student learning at home or improving parenting skills. Few studies had pre- or posttests and matched control groups. Little demographic information was collected, and outcome measures were not great. Many studies	The analysis did not suggest that PI programs are an effective means of improving student achievement. Serious design, methodological, and analytical errors inherent in studies prevent definite conclusions. Later studies tend to do a better job of linking PI to appropriate outcomes.
C					

Appendix Table A.1

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
				failed to be goal-linked to reasonable outcomes.	
Interactive book reading between parents and children (dialogic reading intervention) LH	Mol, S. E., Bus, A. G., de Jong, M. T., and Smeets, D. J. H. (2008). Added value of dialogic parent-child book readings: A meta-analysis. <i>Early Education and Development, 19(1)</i> , 7-26.	PK (ages 2-5) Effect sizes	Meta-analysis of 16 studies involving 626 parent-child dyads (313 in treatment group, 313 in control group) 14 experiments, 2 quasi-experiments	Moderate effect of dialogic reading on expressive vocabulary ($d = 0.59$) and small effect on receptive vocabulary ($d = 0.22$). The effect was more pronounced for preschool children ($d = 0.50$) than for K children ($d = 0.14$). Children not at risk ($d = 0.53$) benefited more than those at risk ($d = 0.13$).	Interactive book reading, compared with reading as usual, is an effective way to improve expressive and receptive vocabulary.
Parent training in homework strategies, checking homework LH	Patall, E. A., Cooper, H., Robinson, J. C. (2008). Parent involvement in homework: A research synthesis. <i>Review of Educational Research, 78</i> , 1039-1101.	Elementary grades to grade 12 Effect sizes	Meta-analysis of 36 studies 9 randomized experiments, 5 quasi-experiments, 3 NELS studies, 18 studies using regression techniques	Training parents to be involved in homework results in higher rates of homework completion, fewer homework problems, and (possibly) improved academic performance of elementary school children ($d = 0.23^{**}$). Meta-analysis of 20 studies showed positive association for elementary and high school students, negative for middle school students for PI and achievement, strong association for rule setting and achievement, negative for math, and positive for verbal and PI. Elementary (grades 1-6), $r = 0.06^{**}$ Rule setting, $r = 0.54^{**}$ Direct aid, $r = 0.10^{**}$ Reading outcomes, $r = 0.20^{**}$ Language arts, $r = 0.12^{**}$ Math (negative), $r = -0.19^{**}$ Low SES, $r = 0.36^{**}$	Positive support for parental involvement in homework on verbal outcomes in the elementary grades. Rule setting was also an effective type of involvement related to achievement.
Volunteer	Ritter, G. W., Barnett,	K-8	Meta-analysis of	$d = 0.30^*$ for volunteer tutoring on reading overall.	Compared with students

Appendix Table A.1

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
tutoring programs in literacy FIS	J. H., Denny, G. S., and Albin, G. R. (2009). The effectiveness of volunteer tutoring programs for elementary and middle school students: A meta-analysis. <i>Review of Educational Research</i> , 79, 3-38.	(14 studies focused on grade 1) Effect sizes	21 studies of randomized field trials. N = 1,676 students (873 tutored, 803 in control group) (770 in grade 1 and 906 in grades 2 and above)	(Results obtained from overall batteries on such standardized reading achievement tests as Gates-MacGinitie Reading Tests [GMRT], Comprehensive Tests of Basic Skills [CTBS], and Stanford Achievement Tests-Reading.) <i>d</i> = 0.41* for volunteer tutoring on reading letters (word and letter identification and word attack tests, Dynamic Indicators of Basic Early Literacy Skills [DIBELS]). <i>d</i> = 0.45* for volunteer tutoring on writing (spelling, observational survey or writing). No effects by tutor type. Effects on global reading were stronger for structured programs (<i>d</i> = 0.59) than for unstructured programs (<i>d</i> = 0.14).	not tutored, those who had volunteer tutoring had positive effects on literacy achievement related to letters and words, oral fluency, and writing. More structured programs tended to be more effective than less structured programs.
Home-based family literacy interventions (read to child, listen to child read books, tutor specific skills) LH	Sénéchal, M., and Young, L. (2008). The effect of family literacy interventions on children's acquisition of reading from kindergarten to grade 3: A meta-analytic review. <i>Review of Educational Research</i> , 78, 880-907.	K to grade 3 Effect sizes	Meta-analysis of 16 intervention studies involving 1,340 families	PI in home-based literacy interventions had a positive effect on children's reading acquisition: <i>d</i> = 0.65. This represents a 10-point gain on a standardized test for the intervention group, compared with the control group. Strongest effects resulted for tutoring, with an effect size of 1.15, followed by listening to children (0.52), and reading to children (0.18). The optimal amount of parent training seemed to be short (1-2 hours) rather than long (3.0-13.5 hours). The effect size for shorter parent training sessions is quite large: <i>d</i> = 0.97.	This meta-analysis indicates very positive support for home literacy interventions to promote children's reading acquisition. It includes few studies of book reading, so the lack of effects should be interpreted with caution. Intervention effects were similar for children in grades 1 to 3 as for K children.
Home-based family	van Steensel, R., McElvany, N.,	PK to primary grades	Meta-analysis of 30 intervention or	<i>d</i> = 0.17 for code-related literacy skills (emergent literacy skills, like letter identification, initial or final	A small but significant mean effect emerged (<i>d</i>

Appendix Table A.1

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (<i>N</i>)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
involvement in literacy (home activities and training of parents) LH	Kurvers, J., and Herppich, S. (2011). How effective are family literacy programs?: Results of a meta-analysis. <i>Review of Educational Research, 81(1)</i> , 69-96.	Effect sizes	effect studies with experimental and control groups	consonant recognition, and reading rate). <i>d</i> = 0.22 for comprehension-related literacy skills (active or receptive vocabulary, narrative comprehension, story writing). Effects were stronger for programs longer than 5 months (<i>d</i> = 0.21***) than for programs shorter than 5 months (<i>d</i> = 0.13**). Additionally, programs that combined shared reading with other activities proved more effective (<i>d</i> = 0.21***) than those with only shared reading (<i>d</i> = 0.05; not significant) or literacy exercises alone (<i>d</i> = 0.17; not significant).	= 0.18) for the relation of home-based literacy activities and code- and comprehension-related skills.

Appendix Table A.1

Family Involvement Literature Review

Appendix Table A.2

Studies of Family Involvement in Math Activities and Math and Social-Emotional Outcomes ($N = 43$)

NOTES: Kinds of parental involvement (PI) measured in the study: LH = learning activities at home; P = supportive parenting; FIS = family involvement in school; C = composite measure of involvement at home and at school.

*An asterisk in the leftmost column indicates that the study measured a social-emotional outcome.

d = report of effect size; b = unstandardized beta coefficient; β = standardized beta coefficient; PI = parent involvement; PK = prekindergarten: ages 3 to 5; K = kindergarten.

Studies of Preschool Children (9 Studies)

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
Home learning environment LH	Blevins-Knabe, B., Austin, A. B., Musun, L., Eddy, A., and Jones, R. M. (2000). Family home care providers' and parents' beliefs and practices concerning mathematics with young children. <i>Early Child Development and Care</i> , 165(1), 41-58.	PK Not longitudinal Correlation	$N = 64$ children, 54 parents Majority were European-American	Study examined whether the reported activities of parents and family daycare providers predicted children's <i>mathematics</i> skills (Test of Early Mathematics Ability [TEMA]-2). The frequency of math activities reported by parents or family daycare providers was not significantly correlated with children's mathematics achievement scores in either age group.	Parents and family daycare providers tend to report similar frequencies for engaging children in math activities. The frequency of math activities reported by parents and family daycare providers, however, was unrelated to children's math scores.
Home learning environment LH	Huntsinger, C. S., Jose, P. E., Liaw, F. R., and Ching, W. D. (1997). Cultural	PK to K Not longitudinal	$N = 120$ European-American,	Study scored parent-reported mathematics teaching methods on a 3-point scale from 1 (informal, indirect, spontaneous, and play-oriented) to 3 (formal, direct, regular, and work oriented) and examined their	Chinese-American parents and (to a lesser degree) Taiwan-Chinese parents used more formal

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
	differences in early mathematics learning: A comparison of Euro-American, Chinese-American, and Taiwan-Chinese families. <i>International Journal of Behavioral Development, 21(2), 371-388.</i>	Hierarchical multiple regression MANOVA	Chinese-American, Taiwan-Chinese High SES	relation to children's <i>mathematics knowledge</i> (TEMA-2) and <i>maturity of numeral formation</i> . Controlling for child age and ethnicity, parent math attitudes, parent child-specific math beliefs, and parent work-oriented practices positively predicted TEMA-2 scores ($\beta = 0.23^{**}$) significantly and maturity of numeral formation ($\beta = 0.17$; $p < 0.06$) at a trend level.	teaching with their children, and their children spent more time practicing math. Children who received more formal teaching and who spent more time in practice had higher math scores and more mature written numerals.
Home learning environment LH	Huntsinger, C. S., Jose, P. E., Larson, S. L., Krieg, D. B., and Shaligram, C. (2000). Mathematics, vocabulary, and reading development in Chinese American and European American children over the primary school years. <i>Journal of Educational Psychology, 92(4), 745-760.</i>	PK to K Longitudinal Hierarchical multiple regression	$N = 80$ children and families 40 European-American, 40 Chinese-American Middle-class	Study examined parental practices (for example, work-oriented math methods) and parental beliefs as predictors of children's math scores on the Sequential Assessment of Mathematics Inventories (SAMI) in grades 1-2 and grades 3-4. Parent's work-oriented math methods ($\beta = 0.20$) and parental beliefs ($\beta = 0.20$) in preschool or kindergarten positively predicted math scores in grades 3-4 but not in grades 1-2.	Parental practices at an early age influence children's mathematics achievement 4 years later.
Home learning environment, supportive parenting, curriculum-	Noble, K. G., Duch, H., Darvique, M. E., Grundleger, A., Rodriguez, C., and Landers, C. (2012).	PK Longitudinal, intervention, randomized	$N = 56$ 95% Hispanic or Latino, 91% speaking	Intervention (small pilot) study that tested the effect of the Getting Ready for School (GRS) program on preschoolers' <i>math</i> (Woodcock-Johnson Applied Problems and Quantitative Concepts subscales) and <i>literacy</i> (Woodcock-Johnson Letter-Word	Targeted intervention that actively involves parents has potential to improve children's math skills over and above

Appendix Table A.2

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
based LH, P	Getting ready for school: A preliminary evaluation of a parent-focused school-readiness program. <i>Child Development Research</i> , 2012, 1-14.	Multivariate, repeated measures Generalized linear model (GLM)	primarily Spanish at home Head Start	<p>Identification, Passage Comprehension, Understanding Directions, and Picture Vocabulary subscales). The GRS program is a parent-focused curriculum designed to help parents promote children's school readiness skills in reading and math through weekly 2-hour workshops led by a trained facilitator over 15 weeks.</p> <p>Intervention group improved significantly more than comparison group on Applied Problems ($F [1, 46] = 5.9; p < 0.019$).</p> <p>GRS program was unrelated to all other subscales, but change from pre- to posttest was in the predicted direction for most subtests.</p>	<p>Head Start as usual. Positive response to program and materials, with parents reporting positive changes in children's skills and attitude toward learning. Parents also reported that the program taught them how to teach and support their child and that a coordinated effort between them and the teachers would improve child's outcomes.</p>

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
*PI at home, PI at school C	Powell, D. R., Son, S. H., File, N., and San Juan, R. R. (2010). Parent-school relationships and children's academic and social outcomes in public school pre-kindergarten. <i>Journal of School Psychology, 48</i> , 269-292.	PK Longitudinal Hierarchical linear modeling (HLM)	N = 140 Assessments at beginning and end of school year 43% African-American, 36% European-American, 14% Latino, 14% other, 7% not reported	Study examined parental home and school involvement as predictors of children's <i>math, literacy</i> (Applied Problems and Letter-Word Identification subtests of Woodcock-Johnson III), <i>vocabulary</i> (Peabody Picture Vocabulary Test [PPVT]-III), and <i>social skills</i> and <i>behavior problems</i> (Social Skills Rating Scale [SSRS]). Parental home involvement was assessed by a composite score from parent reports of the frequency that they engaged with their child in 9 activities (reading, telling a story, teaching letters/words/numbers, playing counting games, playing with blocks, playing with puzzles, and playing with shapes). Parental school involvement was also assessed by parent reports of the frequency of participation in 11 activities (such as attending parent-teacher conferences, volunteering or observing in the classroom, helping with field trips, preparing or delivering materials or newsletters, attending school social events or workshops or meetings, and participating in fund-raising). Models controlled for fall score, minority status, maternal education, parents' perceptions of the teacher's responsiveness to them and their child, and observed quality of teacher interactions with children. Stronger parent-school relationships related to higher math scores ($d = 0.36$). Parental home involvement was not predictive of math scores. Stronger parent school involvement was related to better social skills ($d = 0.55$) and fewer problem behaviors ($d = 0.47$). Parental home involvement was not predictive of social skills.	Study examined 2 dimensions of parent-school relationships in pre-K. Effect sizes were medium. Study did not find any significant results between parental home involvement and children's outcomes, but it used a composite measure and did not differentiate between parents' promotion of literacy versus math activities.

Appendix Table A.2

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
Home learning environment, supportive parenting LH, P	Sears, N., and Medearis, L. (1992). Natural math: A progress report on implementation of a family involvement project for early childhood mathematics among children of the Oklahoma Seminole Head Start and Boley Head Start. Paper presented at the Rocky Mountain Research Association, Stillwater, OK, October 1992.	PK Longitudinal, intervention, nonrandomized, t-test	N = 140 Head Start	In the Natural Math Project, schools provided take-home packs to supply materials that families needed for math activities. Monthly family meetings were held to explain the activities, and a math fair was held at the end of the school year. The study used a static-group comparison and compared intervention students' kindergarten screening data (ABC Inventory — composite of verbal, math, and social learning) to students from prior year. Children participating in Natural Math Project showed no significant differences on screening scores than children from the previous year.	No significant differences were found between groups. However, this was a limited study design; the degree of program involvement was not controlled for; and the intervention group included children who did and did not participate fully in the project. Some parents reported increased use of math games and more attention to the use of numbers.
Home learning environment, supportive parenting, curriculum-based LH, P	Starkey, P., and Klein, A. (2000). Fostering parental support for children's mathematical development: An intervention with Head Start families. <i>Early Education and Development</i> , 11(5), 659-680.	PK Longitudinal, intervention, randomized, control group ANOVA, ANCOVA	Study 1: N = 28 mother-child dyads, predominantly African-American Study 2: N = 31 mother-child dyads, predominantly Latino Head Start	The Family Mathematics Curriculum provides low-income families with a structured intervention in which parents and children attend family math classes and have access to math materials for use at home. Study 1 tested the effect of the curriculum on children's <i>informal math knowledge</i> (composite of <i>numerical</i> tasks [enumeration and numerical reasoning] and a <i>spatial/geometric</i> task [spatial reference]) and <i>emergent literacy</i> (print awareness, reading conventions). Study 2 tested the effects on the same <i>numerical</i> and <i>emergent literacy</i> tasks as well a <i>geometric reasoning</i> task. Children receiving the curriculum had significantly higher posttest scores than the comparison group	Two intervention studies show that low-income parents are willing and able to support children's math development when provided with training. Informal math knowledge of the intervention children developed significantly over the course of preschool. Intervention was effective for children in both the

Appendix Table A.2

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
Home learning environment LH	Vandermaas-Peeler, M., Boomgarden, E., Finn, L., and Pittard, C. (2012). Parental support of numeracy during a cooking activity with four-year-olds. <i>International Journal of Early Years Education, 20(1)</i> , 78-93.	PK Not longitudinal, intervention, randomized, control group ANOVA, t-test	N = 25 dyads 100% Caucasian Middle to high SES	Intervention study in which parents were asked to conduct a cooking activity in their home with their child. Parents were given recipe cards, and children were given simple, illustrated recipe cards. Parents who were randomized into the numeracy group received special recipe cards with suggested numeracy activities to include in different recipe steps, and comparison group parents received regular recipe cards. Children in the numeracy group generated more correct math responses (42 correct responses, compared with 15), although they were also asked more questions. No significant differences were found between groups on posttest <i>math skills</i> (based on TEMA-3).	lower and upper parts of the developmental range in math knowledge. Parents can incorporate math into ongoing events but do not spontaneously provide advanced numeracy guidance in everyday interactions (such as cooking). Numeracy group parents provided more numeracy guidance (for example, question, hints). However, no significant differences in posttest scores were found across groups.
Home learning environment LH	Vandermaas-Peeler, M., Ferretti, L., and Loving, S. (2011). Playing the ladybug game: Parent guidance of young children's numeracy activities. <i>Early Child Development and Care, 182(10)</i> , 1289-1307.	PK Longitudinal, intervention, randomized, control group ANOVA, correlation	N = 28 dyads Majority were Caucasian Middle to high SES	Intervention study in which parents played a board game (Ladybug Game) with their child in 3 sessions over 2 weeks. Parents who were randomized into the numeracy awareness group were given suggested numeracy activities to incorporate into the games, while comparison group parents did not have suggested activities. Study examined parents' guidance (that is, asking questions and providing explanations regarding number skills). Children in the intervention and control groups were compared on their <i>math skills</i> (TEMA-3). Children in the numeracy awareness group generated a higher percentage of correct responses (82%) than the comparison group (80%).	Parents are able to incorporate numeracy into games without training. Numeracy group parents incorporated twice as many basic and advanced number activities into the games. Children exposed to more numeracy questions generated more correct responses and errors but did not show

Appendix Table A.2

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (<i>N</i>)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
				Parent guidance for addition/subtraction at sessions 2 ($r = 0.45$) and 3 ($r = 0.58$) related to math skills. Parent guidance for counting, number recognition, number comparison, and number sequencing were unrelated to math skills.	differences across groups in math skills.

Studies of Kindergarten Children (11 Studies)

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
Supportive parenting P	Crane, J. (1996). Effects of home environment, SES, and maternal test scores on mathematics achievement. <i>Journal of Educational Research</i> , 89(5), 305-314.	Ages 5 to 9 Longitudinal Weighted least squares regression	N = 1,123 children from a subsample of the National Longitudinal Survey of Youth (NLSY) Nationally representative	Study examined intellectual stimulation and emotional support in the home (Home Observation for Measurement of the Environment [HOME]), predicting children's <i>mathematics</i> scores (Peabody Individual Achievement Tests [PIAT]). Intellectual stimulation had the largest effect on math scores (SD increase by 4.6 percentiles), controlling for child's race/ethnicity, family SES, and mother's cognitive ability.	The combined effect of home environment variables (1 percentile point increase in both intellectual stimulation and emotional support) raised mathematics scores 0.44 percentile point.
School outreach practices O	Epstein, J. L. (2005). A case study of the Partnership Schools Comprehensive School Reform (CSR) model. <i>Elementary School Journal</i> , 106(2), 151-170.	K to grade 5 Longitudinal, intervention, nonrandomized	N = 1 elementary school (about 375 children) About 51% of students received free or reduced-price lunch	Case study of implementation of the Partnership Schools Comprehensive School Reform (CSR) model over three years in a Title I elementary school. A Math Partnership Team — including parents, teachers, administrators, and community partners — focused on the school's math program strengths and needed improvements. Parent engagement activities included math motivators (activities each year, including a "Mathathon"), Teachers Involve Parents in Schoolwork (TIPS) interactive homework at all grade levels, math vocabulary project to help parents understand their children's math program. Fourth-grade students <i>math state test scores</i> (Connecticut Mastery Test [CMT]) were compared across the elementary school implementing the CSR model and a comparison school with similar test scores at the beginning of the study. In the CSR school, the percentage of students with Level 4 (grade-level) scores on the CMT math test	When math teachers across the grades (K-5) implemented TIPS in math, most parents became involved and were grateful for the guidance the TIPS activities provided without asking parents to come to meetings at school, and children's math scores on state tests improved over time, compared with scores in comparison schools

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
				increased from 54% to 63% to 66% over the 3 years, while the percentage of students at grade level in a comparison school changed from 54% to 51% to 60%.	
Global home learning environment, family involvement at school, school outreach LH, FIS, C, O	Galindo, C., and Sheldon, S. B. (2012). School and home connections and children's kindergarten achievement gains: The mediating role of family involvement. <i>Early Childhood Research Quarterly</i> , 27(1), 90-103.	K Longitudinal Hierarchical linear modeling (HLM)	N = 16,425 children from the Early Childhood Longitudinal Study of Kindergarten (ECLS-K) cohort Nationally representative: 60% non-Latino whites, 14% non-Latino blacks, 18% Latino, 5% Asian, 3% other	Study examined the influences of practices designed to engage parents in their children's education on parent behaviors and children's <i>math and reading gains</i> in kindergarten (ECLS-K assessments). Family involvement at school was measured by parent reports of participation in school-related activities, including attending open house, parent-teacher-student and parent-teacher conferences, class events, volunteering, fund-raising. Family involvement at home was assessed by parent reports of the frequency that they engaged their child in educational activities, such as reading books, telling stories, singing songs, doing arts and crafts, doing chores, playing games or doing puzzles, talking about nature and doing science projects, and building things together. School outreach was assessed by principal reports of the frequency of activities that the school conducted to engage families (such as PTA/PTO meetings, report cards, parent-teacher conferences, home visits, school performances, and classroom programs like plays, book nights, and family events). Parents' educational expectations were assessed by parent reports of how far they thought their child would go in school. Analyses controlled for child, family, and school background characteristics. Family involvement at school was associated with gains in math ($\beta = 1.03$) and reading ($\beta = 0.85$). Family involvement at home was not related to	Family involvement at school (but not at home) was significantly positively associated with reading and math gains. Family involvement at school partially mediated the association between school outreach and achievement gains. Effect sizes of family involvement on children's outcomes were small: family involvement at school for reading = 0.05 and for math = 0.04. Even smaller effect sizes were found for parents' educational expectations and for family involvement at home: 0.02 for reading and 0.01 for math gains

Appendix Table A.2

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
				gains in reading or math. Parents' educational expectations were associated with gains in math ($\beta = 0.15$) and reading ($\beta = 0.18$). School outreach associated with students' gains in reading ($b = 0.38$) and math ($b = 0.37$). Family involvement at school was a significant mediator of the influence of school outreach efforts on gains in reading and math.	
Global measure of child out-of-school activities, PI at school and home learning C	Greenman, E., Bodovski, K., and Reed, K. (2011). Neighborhood characteristics, parental practices and children's achievement in elementary school. <i>Social Science Research, 40</i> , 1434-1444.	K to grade 5 Longitudinal Multilevel modeling	$N = 10,049$ 11% black, 19% Hispanic, 7% Asian, 4% other	Study examined neighborhood characteristics and education-related parental practices early in children's schooling (K to grade 1) and their association with children's math achievement in grade 5 (ECLS-K standardized math test score). Education-related parental practices were assessed as a composite of 3 domains: (1) whether child participates in activities outside school, such as dance lessons, athletics, and educational outings; (2) PI in children's school (such as whether parent participated in parent-teacher conferences, open house, PTA); and (3) parents' provision of home learning environment (number of children's books in the home). Models controlled for child and family characteristics. A significant interaction was found between neighborhood disadvantage and education-related parental practices ($\beta = 0.08$) in predicting 5th-grade math scores.	Early parental education-related practices were positively related to math achievement in grade 5, particularly for children in highly disadvantaged neighborhoods. Positive effects of parental practices on math achievement did not differ by race/ethnicity. Study also found that as neighborhood disadvantage becomes more severe, education-related parental practices, as well as math test scores, decrease.
Home learning environment	Jacobs, J. E., and Bleeker, M. M. (2004). Girls' and boys'	K and grades 1, 3	$N =$ less than 500 Over 95%	Study examined how PI in promoting math and science activities at home predicted parent reports of children's math and science involvement 2 years later	PI in math activities at home is positively related to their children's later

Appendix Table A.2

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
LH	developing interests in math and science: Do parents matter. <i>New Directions for Child and Adolescent Development</i> , 106, 5-21.	Longitudinal 3 time points: Grades 1, 2, 4 Grades 3, 4, 5 Grades 7, 8, 9 Hierarchical multiple regression	European-American Middle-class	and child reports of their math and science interest 6 years later. PI was assessed by parent reports of (1) how often they participated in math and science activities with their child, (2) the number of math and science items purchased for the child in the past year, and (3) the frequency of modeling — how often they participated in math and science activities themselves. Mothers' and fathers' involvement was examined separately. Models controlled for child's gender, cohort, child's math interest, parent's math value, parent's perception of child's math ability. Mothers' time spent math modeling ($\beta = 0.17$) and math and science purchases ($\beta = 0.21$) at Year 2 (grades 1, 2, 4) positively predicted children's math and science involvement outside school 2 years later. Fathers' math and science purchases ($\beta = 0.19$) at Year 2 positively predicted children's math and science involvement outside school 2 years later as well as children's math interests ($\beta = 0.13$) 6 years later.	interests and activities in math. This involvement, though, seems to depend on the gender of the child and the parent: Mothers were more likely to purchase math and science items for sons than for daughters, regardless of the child's grade in school. Both mothers and fathers were more likely to be involved in math and science activities at home with their daughters than with their sons.
Home learning environment, parenting practices LH, P	Pan, Y., Gauvain, M., Liu, Z., and Cheng, L. (2006). American and Chinese PIPI in young children's mathematics learning. <i>Cognitive Development</i> , 21(1), 17-35.	Ages 5 and 7 Not longitudinal Hierarchical multiple regression	$N = 72$ 32 American mothers: 81% European-American, 13% African-American or Latino, 6% other	Study examined parent reports of involvement in children's everyday number learning and children's performance on a <i>math interaction task</i> . Mothers reported how frequently they used everyday activities to help their child learn about numbers. Mothers and children completed 12 math interaction tasks in a lab or school where they distributed food to baby, mommy, and daddy troll dolls. Mothers' statements were coded for math-concept-focused instruction (that is, pertaining to mathematical relations, such as correctly specifying the ratio relations of the problem),	Chinese mothers reported helping their 7-year-olds with number learning more than American mothers did, but no differences were found between mothers of 5-year-olds. Chinese mothers of both 5- and 7-year-olds were more likely than American

Appendix Table A.2

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
			40 Chinese mothers	<p>more or less instruction, and calculation-focused instruction.</p> <p>Controlling for age and child's individual test performance (arithmetic items), frequency of maternal involvement in number learning at home positively related to children's performance on math interaction tasks among both American ($\beta = 0.34$) and Chinese ($\beta = 0.26$) children.</p> <p>Controlling for age, calculation-focused instruction was negatively related ($\beta = -0.81$), while concept-focused instruction was positively related ($\beta = 0.44$), to Chinese children's performance on math interaction tasks.</p>	<p>mothers to report teaching their children math calculation.</p> <p>Mothers' instruction during the lab/school task was unrelated to children's math test performance.</p>
*Home learning environment, family involvement at school LH, FIS	Roopnarine, J. L., Krishnakumar, A., Metindogan, A., and Evans, M. (2006). Links between parenting styles, parent-child academic interaction, parent-school interaction, and early academic skills and social behaviors in young children of English-speaking Caribbean immigrants. <i>Early Childhood Research Quarterly</i> , 21, 238-252.	K Not longitudinal Hierarchical multiple regression	N = 70 English-speaking Caribbean immigrant families who represent diverse ethnic groups: African-, Indo-, Chinese-, and Portuguese-Caribbean Majority of families earned between \$50,000 and \$99,999 per	<p>Study examined how the 3 parenting styles (authoritative, authoritarian, permissive) and 2 parent reports of academic socialization behaviors (parent-school involvement in academic activities at home and parent-school contact) were related to children's <i>number</i>, <i>expressive</i>, and <i>vocabulary skills</i> (Kaufman Survey of Early Academic and Language Skills) and parent ratings of children's <i>social behavior</i>. Analyses examined maternal and paternal involvement separately and controlled for child's age, parents' education, and length of stay in the United States.</p> <p>Neither maternal nor paternal involvement in academic activities at home was associated with number skills, controlling for parenting styles.</p> <p>Neither maternal nor paternal school contact was associated with number skills, controlling for parenting styles.</p> <p>Father-school contact was associated with</p>	<p>Children of Caribbean immigrants received broad support for academic activities at home; however, this was unrelated to children's tested number skills.</p> <p>Fathers', but not mothers', contact with children's school was associated with children's early academic skills, controlling for maternal influences. Positive associations between fathers' parenting and children's outcomes beyond the effects of</p>

Appendix Table A.2

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N) year	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
				expressive skills ($\beta = 0.33$) and with vocabulary skills ($\beta = 0.25$), over and above maternal parenting styles, academic involvement at home, and contact with school. Fathers' academic interactions at home ($\beta = 0.33$) and mothers' contact with school ($\beta = 0.22$; $p < 0.10$) were positively associated with child's social behaviors.	mothers suggests that fathers may carry more influence in facilitating academic and social skills in children.
School outreach (transition practices), family involvement at school O, FIS	Schulting, A. B., Malone, P. S., and Dodge, K. A. (2005). The effect of school-based kindergarten transition policies and practices on child academic outcomes. <i>Developmental Psychology, 41</i> (6), 860-871.	K to grade 1 Longitudinal Hierarchical linear modeling	$N = 17,212$ (ECLS-K) 57% white, 14% black, 17% Hispanic, 6% Asian, 1% Native Hawaiian / other Pacific Islander, 2% Native American or Alaskan Native, 3% more than one race 20% living below poverty line	Study examined the effect of school-based K transition practices on preschoolers' <i>academic achievement scores</i> at the end of K (composite of ECLS-K standardized scores in reading, math, and general knowledge). Also examined parent-initiated involvement at school as a mediator of this relation. School transition practices were measured by the total number of practices endorsed by K teachers as being implemented at their school (for example, information about K program sent home to parents, preschoolers spend time in K classrooms, shorter school days at start of year, parents and child visit K classroom, teachers do home visits, parents attend orientation session). Parent-initiated involvement was assessed by parent reports of how often they participated in activities and events at the school over the course of the K year (such as open house, back-to-school night, PTA meeting, parent-advisory group or policy council meetings, parent-teacher conferences, school or class events, volunteering, fund-raising). Models controlled for child, teacher, and school factors Number of school-level transition practices predicted academic achievement ($\beta = 0.51$).	K transition polices have a modest positive effect on children's academic achievement and parent-initiated school involvement during K, even after controlling for SES and other demographic factors. The effect of transition practices was stronger for children from average- or low-income families than for children from high-income families. Low-income children, however, were more likely to receive the more generic and low-intensity transition practices. Increases in SES were correlated with greater

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				<p>Parents and children visiting K was the only transition practice showing a main effect on achievement ($\beta = 1.26$). This practice also interacted with SES ($\beta = -0.58$) and SES² ($\beta = -0.39$); the effect of transition practices was greater at lower SES.</p> <p>Parent-initiated school involvement also predicted academic achievement ($\beta = 0.89$).</p>	<p>rates of PI at school, higher academic achievement, and a larger number of transition practices.</p>
School outreach, family and community collaboration with schools FIS, O	Sheldon, S. B., Epstein, J. L., and Galindo, C. (2010). Not just numbers: Creating a partnership climate to improve math proficiency in schools. <i>Leadership and Policy in Schools</i> , 9(1), 27-48.	<p>Mostly K to grade 8; some middle or high schools</p> <p>Longitudinal</p> <p>Ordinary least squares (OLS) regression</p>	<p>N = 39 schools</p> <p>Predominantly low-income</p>	<p>Study examined what schools are doing to effectively involve families and community members, particularly in terms of math, and whether this improves <i>math achievement</i> for schools (standardized math achievement tests).</p> <p>Strategies used by schools included a variety of things, such as parent workshops or conferences regarding math, math activities in school or classroom newsletters, sending math progress reports, and hosting math nights.</p> <p>Schools reporting more positive partnership climates had higher percentage of students proficient in math on state achievement tests ($\beta = 0.27$), controlling for poverty, prior math performance, and average partnership practice effectiveness.</p>	<p>Better implementation of math-related school practices that look to engage parents and communities was related to stronger support from parents for schools' partnership programs. Only a few schools used community connections to improve students' math achievement.</p>

Appendix Table A.2

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
Family involvement in school, supportive parenting FIS, P	Simpkins, S. D., Weiss, H. B., McCartney, K., Kreider, H. M., and Dearing, E. (2006). Mother-child relationship as a moderator of the relation between family educational involvement and child achievement. <i>Parenting: Science and Practice, 6(1)</i> , 49-57.	K Not longitudinal Hierarchical OLS regression	N = 175 48% African-American, 28% Latin American, 21% European-American, 1% biracial, 10% other Low-income; median household income: \$12,001-\$15,000	Study examined moderating effect of mother-child warmth and conflict on relations between family educational involvement and kindergarteners' math (PIAT-R) and literacy skills (average of standardized scores on letter/sound identification, word reading, writing, oral comprehension, overall reading, and verbal fluency). Family educational involvement was assessed by mother report of participation in school activities, such as parent-teacher conference, open house, school meeting, curriculum event, performance, social event, field trip, classroom visits, volunteering. Mother-child relationship was measured by mother report of warmth and conflict in the relationship (abbreviated version of Child's Relationship with Me Scale). Controlling for child and family factors, maternal perceptions of warmth had significant moderating effect on relations between family educational involvement and children's math ($\beta = 0.65$) and literacy ($\beta = 0.62$) achievement. There was little evidence that the interaction varied across different types of families (although the moderating effect of warmth was significant in predicting math for families in which the mother had a partner who lived in the home, but not for mothers without a partner).	The positive association between maternal involvement in children's education and child's math and literacy achievement became stronger when the mother and child had a warm relationship. Maternal involvement was not related to child outcomes when conflict was in the model. Findings suggest that efforts to increase PI in schools may be most likely to improve achievement when the overall quality of the parent-child relationship is addressed.

Appendix Table A.2

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
Family involvement in school, homework supervision, parents' expectations FIS, P	Zhan, M. (2006). Assets, parental expectations and children's educational performance. <i>Children and Youth Services Review</i> , 28, 961-975.	Ages 5 to 14 Longitudinal Ordinary least squares (OLS) regression	N = 1,370 (NLSY79) Mother's race/ethnicity: 69% white, 25% African-American, 6% other Mean household income over past 5 years: \$55,766	Study examined parental assets (net worth), PI in children's education (in school activities and supervision of homework), and parents' expectations of how far their child will go in school, when children were ages 5 to 12, as predictors of math and reading scores (PIAT) 2 years later. PI in school activities was assessed by child reports of how frequently either of their parents attended school meetings, spoke to teacher and counselors, attended school events, and volunteered at school. PI in homework supervision was measured by child reports of how frequently their parents checked on whether they had done homework and how their parents helped with their homework. Parents' expectations were assessed by mother reports. Controlling for child and family factors, mothers' expectations of how far child will go in school was significantly related to math scores ($b = 2.79$) and reading scores ($b = 3.24$). Supervision of homework significantly predicted reading scores ($b = 0.23$) but not math scores. PI in school activities was unrelated to math or reading.	The association between PI and children's academic performance was weak; only supervision of homework was related to children's reading scores. Parents' expectations were more related to academic performance. Parental assets were positively related to academic performance, controlling for income and other parent characteristics. Parents' expectations partially mediated the associations between assets and child's performance.

Studies of Children in First Grade and Beyond (11 Studies)

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
Supportive parenting P	Blevins-Knabe, B., Whiteside-Mansell, L., and Selig, J. (2007). Parenting and mathematical development. <i>Academic Exchange Quarterly</i> , 11(2), 76-30.	Age 7 Not longitudinal Structural equation modeling (SEM)	N = 177 Mothers: 89% Caucasian, 7% African-American, 3% other Participating children met Head Start poverty requirements	Study examined mediation of maternal mathematics achievement on child mathematics development through maternal parenting behaviors and maternal attitudes or perceptions of their child's ability in math. Parenting behaviors were assessed as the quality and quantity of stimulation and support available in the home (Home Observation for Measurement of the Environment [HOME) and children's math development — their formal and informal math skills — was assessed with the Test of Early Mathematics Ability (TEMA-2). Parenting behaviors had a direct effect on children's informal math skills. Maternal attitudes/perceptions about their child's ability in math had direct effects on both formal and informal math skills.	Responsive parenting and stimulation are important for providing everyday activities that stimulate learning. Study found a direct link between parenting behaviors and informal, but not formal, math skills. This may be because informal math knowledge is based on everyday activity, which is likely captured by the HOME, which examines the home environment broadly but not narrow aspects of parenting behavior related to math.

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
Supportive parenting P	Cancio, E. J., West, R. P., and Young, R. (2004). Improving mathematics homework completion and accuracy of students with EBD through self-management and parent participation. <i>Journal of Emotional and Behavioral Disorders, 12(1)</i> , 9-22.	Grades 6 to 8 Longitudinal, intervention, nonrandomized, no control group Baseline and posttest	N = 6 100% boys Parents had at least a high school diploma; about 50% had some college study	Intervention study of parent training focused on helping parents to establish and maintain a homework completion program based on teaching children to manage their own behavior. Study examined intervention effects on 6th- to 8th-grade students' percentage of homework assignments completed, accuracy of homework assignments, and math achievement (Kaufman Test of Educational Achievement [KTEA-Math]). Students whose parents participated in the homework completion program showed an increase in their math grade equivalent scores of 1 year in approximately 4 months (from 5.3 to 6.3).	Very small study of boys with emotional behavioral disorders. Authors did not report significance levels or other information to help interpret score change.
Learning at home, family involvement at school FIS, HL, C	Catsambis, S., and Beveridge, A. A. (2001). Neighborhood and school influences on the family life and mathematics performance of eighth-grade students. Baltimore and Washington, DC: Center for Research on the Education of Students Placed At Risk.	Grade 8 Not longitudinal Hierarchical linear modeling (HLM)	N = 24,500 (NELS:88)	Study examined PI and neighborhood and school influences on math achievement (math test scores were part of test battery developed by Educational Testing Service [ETS]) in 8th-graders. PI was assessed through 7 indicators: parents' educational expectations, parental activities at home (parent-child communication and parental supervision), parent-school contacts (frequency of participation in school governance), and out-of-school learning opportunities. Analyses controlled for child and family factors (race/ethnicity, SES, maternal work status), child's school-related behavior (attendance and engagement in academic activities), and school characteristics. Indicators of PI predicted math achievement: academic communication ($b = -0.28$),	Children from disadvantaged neighborhoods and schools with high percentages of student poverty and absenteeism tend to have lower math achievement. Characteristics of disadvantaged neighborhoods tend to influence math achievement indirectly by reducing parental practices that are associated with high math

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				<p>academic/behavioral supervision ($b = -0.91$), communication with school ($b = -1.10$), PTO participation ($b = 0.21$), music/dance lessons ($b = 0.78$), and museum visits ($b = 0.46$); the strongest predictor was parents' educational expectations ($b = 3.03$).</p> <p>Also found interactions with neighborhood characteristics:</p> <ul style="list-style-type: none"> ○ The positive association between parents' educational expectations and math achievement was weakened by negative neighborhood characteristics, suggesting that parental supervision is particularly important for children living in disadvantaged neighborhoods. ○ The negative association between math achievement and academic communication with the child and parental supervision occurs only for those living in advantaged neighborhoods; that is, parental supervision is particularly important for children living in disadvantaged neighborhoods. 	achievement.
*Global family involvement at home and school C	El Nokali, N. E., Bachman, H. J., Votruba-Drzal, E. (2010). Parent involvement and children's academic and social development in elementary school. <i>Child Development, 81(3)</i> , 988-1005.	Grades 1, 3, 5 Longitudinal Hierarchical linear modeling (HLM)	$N = 1,364$ students from National Institute of Child Health and Human Development (NICHD) and Study of Early Child Care and Youth Development	Study examined within- and between-child associations among maternal and teacher reports of PI and children's achievement scores (Applied Problems, Picture Vocabulary, Letter-Word Identification subtests of Woodcock-Johnson-Revised), social skills (Social Skills Rating System [SSRS]), and problem behaviors (Child Behavior Checklist, Teacher Report Form) from grades 1 to 5. Parent and teacher reports of PI were separate composites of the frequency and quality of parents' involvement in children's educational progress in	The between- and within-child analyses of PI and achievement showed consistent findings. Greater engagement in PI practices were mostly unrelated to academic achievement, and improvements in PI did not predict gains in achievement. Increases in

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Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
			(SECCYD) 78% non-Hispanic white, 13% black, 6% Hispanic, 5% other Generally high SES; average income-to-needs ratio = 4.12	<p>school and at home. Items reflected parental encouragement of education, parental investment in education, and parental educational attitudes. PI was assessed at grades 1, 3, and 5.</p> <p><i>Within-child effects:</i> Increases in PI were unrelated to individual growth in academic skills, regardless of reporter. (Exception: Increase in teacher reports of PI related to decline in reading.) Increases in mother reports of PI related to teacher reports of social skills (0.22 SD) and problem behaviors (0.12 SD) as well as mother reports of problem behaviors (0.08 SD). Increases in teacher reports of PI related to teacher reports of social skills (0.12 SD) and problem behaviors (0.08 SD).</p> <p><i>Between-child effects:</i> Average levels of PI unrelated to average level or growth in achievement. Higher average mother reports of PI predicted higher average mother (0.09 SD) and teacher reports (0.15 SD) of social skills but not growth in achievement. Higher average teacher reports of PI related to higher average mother (0.43 SD) and teacher reports (0.21 SD) of social skills and teacher reports of problem behaviors (0.36 SD) but not growth in achievement.</p>	<p>PI over time were related to increases in social skills and declines in problem behaviors for both reporters of involvement.</p> <p>PI may be globally beneficial for academic performance but may not promote achievement in a particular domain.</p>
Home learning environment	Guberman, S. R. (2004). A	Grades 1 to 3	N = 49	Study examined parent interview reports of children's out-of-school activities and their relation	Study highlights the potential connection

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Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
LH	comparative study of children's out-of-school activities and arithmetical achievement. <i>Journal for Research in Mathematics Education</i> , 35(2), 117-150.	Not longitudinal t-test	Korean American and Latin American	to children's performance on math problem tasks in Latin American and Korean American children. Parents reported on and described children's everyday activities with arithmetic and money. Children with high home involvement in academic activities without money correctly solved more problems using "chips" than children with low home involvement: $t(36.87) = 3.0$; $p < 0.005$. Children with high home involvement in instrumental activities with money correctly solved more problems using money than did children with low home involvement with money: $t(28.94) = 2.2$; $p < 0.05$.	between culture and children's developing mathematical understanding, emphasizing the importance of culturally relevant school instruction that builds on the informal math knowledge that children may be developing at home.
Family involvement at school, school outreach FIS, O	Haghighat, E. (2005). School social capital and pupils' academic performance. <i>International Studies in Sociology of Education</i> , 15(3), 213-235.	Grade 8 Not longitudinal Hierarchical linear modeling (HLM)	$N = 24,599$ (NELS:88) Nationally representative sample of 8th-graders	Study examined PI factors and their relation to student academic performance in <i>math</i> and <i>reading</i> (standardized math and reading test scores). PI factors included parental connectedness and involvement, school outreach, and school ambiance. Parental connectedness was measured by child reports of parental connectedness with the school (whether either parent attended a school meeting, spoke to teacher/counselors, visited classes, attended a school event; contacted the school about academic performance, academic program, or child behavior; did volunteer work; belonged to a PTO, attended parent-teacher meetings; how often child talked to parents about planning high school program and about selecting courses or programs at school). School outreach was assessed by an averaged composite at the school level of parent, child, and teacher reports of the school's systematic outreach to	This study highlighted the importance the school can play in creating an environment where children to learn and parents become involved. While parental connectedness and involvement – as measured by the child – was positively related to reading test scores but unrelated to math test scores, school ambiance predicted both child outcomes and school outreach efforts to involve parents predicted

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Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (<i>N</i>)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
				involve parents. School ambience was measured by an averaged composite of parent, teacher, and principal reports of the school's learning and discipline atmosphere. Analyses controlled for child, family, and school factors. Parental connectedness and PI were unrelated to math test scores but positively related to reading scores ($b = 0.50$). School outreach ($b = 2.75$) and school ambience ($b = 1.05$) contributed to math scores, and school ambience ($b = 1.26$) predicted reading scores.	math scores. Although these analyses accounted for some child factors, it was unable to account for children's earlier academic scores.
School outreach O	Holt, J. K., and Campbell, C. (2004, May 31). The influence of school policy and practice on mathematics achievement during transitional periods. <i>Education Policy Analysis Archives</i> , 12(23).	Grades 8-12 Longitudinal Hierarchical linear modeling (HLM)	$N = 16,489$ (NELS:88) Students who completed all three surveys: from 1988, 1990, and 1992	Study examined effects of school policies and practices on <i>math achievement growth</i> (IRT-scaled mathematics achievement score) as children transition from middle to high school (grades 8 to 12). School promotion of PI was assessed by a questionnaire completed by school administrators. Analyses controlled for school context variables (for example, percentage Hispanic, African-American; single parents; free and reduced-price lunch; absenteeism; school violence). Whether school promoted PI significantly contributed to acceleration in (quadratic) growth from grades 8 to 12 ($\beta = 0.09$).	The quadratic growth model provided better fit to the data than the linear growth model, suggesting that the math achievement and the change in math growth increased by grade level. Study also found a positive influence of school policies and practices on math achievement growth while controlling for school contextual variables.
PI at school, home learning activities	Patel, N., and Stevens, S. (2010). Parent-teacher-student discrepancies	Grades 6 to 8 Not longitudinal	$N = 179$	Study examined discrepancies among parent, teacher, and child perceptions of child's ability in predicting PI and school programs for involvement. PI and school programs for involvement were	In general, as parent-teacher or parent-child discrepancies increased, parents tended to be less

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C	in academic ability beliefs: Influences on parent involvement. <i>School Community Journal</i> , 20(2), 115-136.	Regression		<p>assessed by parent reports on items from the School and Family Partnerships Survey. PI reflected 4 factors: PI, parenting activities, volunteering activities, and activities for learning at home. School programs consisted of school programs, school programs for volunteering, school programs for communication, and school programs for learning at home. Discrepancies in child's ability were assessed through absolute differences in perceptions of ability between parents and the math teacher and between parents and their children. Parents, children, and teachers reported on their perceptions of the child's general scholastic abilities, and parents reported on the grade that they thought their child should have earned in math, given the child's ability.</p> <p>As parent-child discrepancy in perceptions of general scholastic ability increased, the amount of PI activities increased.</p> <p>Parent-teacher discrepancies in English Language Arts ability and in math ability predicted parents' negative reports of collective school programs for facilitating their involvement.</p>	<p>involved, and the school offered fewer opportunities for PI.</p> <p>Although much PI literature suggests lack of English fluency as a barrier to involvement, that was not the case here: Spanish-speaking parents of middle-schoolers were more involved in activities related to their children's education. They also reported more school programs to facilitate PI.</p>
School outreach O	Sheldon, S. B., and Epstein, J. L. (2005a). Involvement counts: Family and community partnerships and mathematics achievement. <i>Journal of Educational</i>	Elementary and middle or high schools Longitudinal Partial correlation	N = 18 schools Predominantly low-income	<p>Study examined schools' learning at-home partnership practices in relation to changes in percentages of students who scored at or above proficiency levels on <i>math</i>. Partial correlations controlling for prior achievement and school level were examined to see the relation between implementation of practices and math proficiency levels.</p> <p>Two partnership practices were positively related</p>	<p>Controlling for prior levels of math achievement, findings showed that effective implementation of practices that encouraged families to support their children's math learning at home was associated</p>

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	<i>Research, 98(4)</i> , 196-206.			to changes in percentages of students scoring at or above proficiency levels, controlling for (1) prior achievement and (2) whether the school was a elementary, middle, or high school: <ul style="list-style-type: none"> ○ Assigning students math homework that requires them to show and discuss math skills with a family member: (1) $r = 0.60$; (2) $r = 0.60$. ○ Offering parents or students math game packets or lending-library activities to use at home: (1) $r = 0.59$; (2) $r = 0.55$. 	with higher percentages of students who scored at or above proficiency on standardized math achievement tests.
Home learning environment LH	O'Connell, S. R. (1992). Math pairs: Parents as partners. <i>Arithmetic Teacher, 40(1)</i> , 10-12.	Grades 4 and 5 Longitudinal, intervention, nonrandomized	N = 70	Intervention study examining the effect of a “math pairs” program on children’s problem-solving ability. The program was designed to use parents as partners for students’ problem-solving assignments done at home. Students with parent partners made greater gains in problem-solving ability; that is, students without partners showed 28% improvement after 8 weeks of classroom lessons, while those with home partners averaged a 39% improvement in problem-solving skills over the same time.	Students with and without partners showed no differences in problem-solving abilities at pretest. This is a preliminary study that shows the importance of involving parents in the educational process at home.
PI in homework HL	Van Voorhis, F. L. (2011). Adding families to the homework equation: A longitudinal study of mathematics achievement. <i>Education and Urban Society, 43(3)</i> , 313-	Grades 3 and 4 Longitudinal, intervention, randomized Multiple regression	N = 153 57% African-American, 43% Caucasian Over 70% qualified for free or reduced-price	Intervention study was designed to improve PI in homework and to promote student learning and parent-teacher communication in grades 3 and 4. Teachers were randomly assigned either to use the Teachers Involve Parents in Schoolwork (TIPS) math process for 1 or 2 years or to conduct homework as usual with their students. Differences between standardized math scores for the intervention and control groups were examined	TIPS had several positive effects, such as higher levels of family involvement in math homework, more positive math homework attitudes and feelings in students across both grades, and higher math achievement.

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Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (<i>N</i>)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
	338.		lunch	(Tennessee Comprehensive Assessment Program [TCAP]). Controlling for prior achievement, gender, race/ethnicity, free/reduced-price lunch, students who used TIPS for 1 year ($\beta = 0.13$) or 2 years ($\beta = 0.19$) had significantly higher standardized math scores than the control group.	

International Studies (10 Studies)

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
Home learning environment LH	Anders, Y., Rossbach, H. G., Weinert, S., Ebert, S., Kuger, S., Lehrl, S., and von Maurice, J. (2012). Home and preschool learning environments and their relations to the development of early numeracy skills. <i>Early Childhood Research Quarterly</i> , 27, 231-244.	PK Longitudinal Latent growth modeling	N = 532 Germany 20% had one or both parents with native language other than German Various socioeconomic and cultural backgrounds	Study examined parents' report of the home learning environment (HLE) in terms of both literacy and numeracy as a predictor of preschoolers' change in numeracy skills (Arithmetic subscale of Kaufman Assessment Battery for Children). The HLE positively predicted baseline scores, but not growth, in numeracy, controlling for child and family factors as well as preschool structural and process-quality characteristics. HLE literacy had a stronger relation with initial numeracy skills ($\beta = 0.29$) than HLE numeracy did ($\beta = 0.14$).	Pre-reading and literacy-related activities and resources were found to be more prevalent at home than numeracy-related activities and resources although parents reported engaging in both. Both literacy- and numeracy-related aspects of the HLE were positively related to children's math skills.

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
Supportive parenting P	Frenzel, A. C., Goetz, T., Pekrun, R., and Watt, H. M. G. (2010). Development of mathematics interest in adolescence: Influences of gender, family, and school context. <i>Journal of Research on Adolescence</i> , 20(2), 507-537.	Grades 5 to 9 Longitudinal Hierarchical linear modeling (HLM)	N = 3193 Germany Varied SES	<p>Study examined students' math interest over time and whether family values for math predicted math interest. Family values for mathematics was assessed by parent rating of the value that math held in the family.</p> <p>Positive effect of family values on student math interest ($b = 0.10$), controlling for classroom math values, teacher enthusiasm, gender, ability group (German school track).</p> <p>Relative to their individual mean interest levels, students' interest scores tended to be higher in years when their parents and classmates expressed higher levels of math values and when the math teacher expressed more enthusiasm.</p>	Downward developmental trajectory of math interest was found leading into adolescence.

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
Home learning, parent communication with teacher LH, FIS	Harper, S. N., and Pelletier, J. (2010). Parent involvement in early childhood: A comparison of English language learners and English first language families. <i>International Journal of Early Years Education</i> , 18(2), 123-141.	K Not longitudinal Multiple regression	N = 42 Canada EL1 families: 92% English only ELL families: 66% East Indian language, 15% East Asian language, 7% European language, 4% Arabic, 1% African language, 7% other	Study examined PI in early childhood among parents who spoke English as a first language (EL1) and parents who were English language learners (ELL) and the relation of PI to children's numeracy (Number Knowledge Test) and reading (Test of Early Reading Ability [TERA-3]). Teachers rated how frequently the parents communicated with the teacher and how involved the parents were in their child's education. The frequency of parents' communication with the teacher and their involvement in the child's education were unrelated to children's math and reading scores.	Parents' frequency of communication with the teacher and their involvement in the child's education did not mediate the relation between parent ratings of child achievement and children's actual test scores. The 2 language groups did not differ in the level of involvement in their child's education, but teachers reported that ELL parents communicated less frequently with them than EL1 parents did.

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
Home learning environment, parents' numeracy expectations LH	Kleemans, T., Peeters, M., Segers, E., and Verhoeven, L. (2012). Child and home predictors of early numeracy skills in kindergarten. <i>Early Childhood Research Quarterly</i> , 27, 471-477.	2nd year of K (ages 5 to 7) Not longitudinal Hierarchical multiple regression	N = 89 The Netherlands 60% of parents completed higher education or academic education (university)	Study examined parent-child numeracy activities (the extent to which parents participated in numeracy-related activities with their child) and parents' numeracy expectations (the extent to which parents expected their child to master a variety of early numeracy skills by the end of K) as predictors of children's numeracy (Utrecht Early Numeracy Test-Revised). Both parent-child numeracy activities ($\beta = 0.33$) and parents' numeracy expectations ($\beta = 0.19$) explained unique variance (13.3%) in children's numeracy scores, controlling for cognitive and linguistic abilities.	Parent-child numeracy activities were concurrently related to children's early literacy skills ($r = 0.33$). Home numeracy practices and parents' expectations were positively related to early numeracy skills.
Home learning environment LH	LeFevre, J., Clarke, T., and Stringer, A. P. (2002). Influences of language and parental involvement on the development of counting skills: Comparisons of French- and English-speaking Canadian children. <i>Early Child Development and Care</i> , 172(3), 283-300.	PK Not longitudinal Multiple regression	N = 65 Canada French-speaking (n = 27) and English-speaking (n = 38) children	Study examined PI as the frequency of parents' teaching their children about numbers, letters, and words and its relation to children's rote counting, object counting, and number recognition. Parent reports of teaching about numbers and letters predicted children's variability in object counting ($\beta = 0.37$) and number recognition ($\beta = 0.45$).	This study examined PI in complex activities (printing letters, numbers, and words; reading words) and not basic activities (naming letters and numbers, counting), finding positive relations with children's math-related outcomes.

Appendix Table A.2

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
Home learning environment LH	LeFevre, J., Polyzoi, E., Skwarchuk, S. L., Fast, L., and Sowinski, C. (2010). Do home numeracy and literacy practices of Greek and Canadian parents predict the numeracy skills of kindergarten children? <i>International Journal of Early Years Education, 18(1)</i> , 55-70.	K Not longitudinal Multiple regression	N = 204 Canada, Greece 100 Greek children (99% spoke Greek at home) and 104 Canadian children (90% spoke English at home)	<p>Study examined the effect of parents' reports of the frequency of various home practices in literacy (writing letters or stories, reading together, number of children's books) and numeracy on Greek and Canadian children's numeracy scores (composite of the Next Number Task and the Numeration subtest of KeyMath-Revised). Home practices in numeracy included both direct activities (counting out money, memorizing math facts, doing math in your head, learning simple sums) and indirect activities (using a calculator, measuring lengths/widths, making/sorting collections, measuring while cooking, playing board games or card games). Analyses controlled for parents' expectations of their children, parents' math attitudes, parents' education, and child's gender.</p> <p>Direct numeracy practices ($\beta = 0.20$) and book exposure ($\beta = 0.40$) were related to numeracy scores for Greek children.</p> <p>Direct numeracy practices ($\beta = 0.24$) were related to numeracy scores for Canadian children.</p> <p>Indirect numeracy practices were unrelated to numeracy outcomes.</p>	<p>Reported home activities differed across the countries: Canadian parents reported reading more frequently, had more children's books, made/sorted collections, and used computer software. Greek parents reported greater frequency of playing board games or card games.</p> <p>Frequency of home numeracy activities that involved direct experiences with numbers or math content was positively related to children's numeracy skills in both countries. For Greek children, home literacy experiences also predicted numeracy outcomes.</p>

Appendix Table A.2

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
Home learning environment LH	LeFevre, J., Skwarchuk, S. L., Smith-Chant, B. L., Fast, L., Kamawar, D., and Bisanz, J. (2009). Home numeracy experiences and children's math performance in the early school years. <i>Canadian Journal of Behavioural Science</i> , 41(2), 55-66.	K to grade 2 Not longitudinal Hierarchical multiple regression	N = 146 Canada	<p>Study examined parent reports of the frequency of involvement in home activities (40 items), including numeracy-related activities (direct and indirect), literacy-related activities, fine motor skills, and general activities unrelated to math or literacy. Using principal components analysis, authors found 4 factors: number skills, games, applications (that is, number-related artifacts), and number of children's books. These 4 home numeracy factors were entered as predictors of children's <i>math knowledge</i> (Numeration, Addition, Subtraction subtests of KeyMath-Revised) and <i>math fluency</i> (accuracy and median latency on correct responses in a test of single-digit addition). Analyses controlled for child's grade, city, gender, vocabulary skills, spatial span, and home literacy factors.</p> <p>Frequency of parent-child involvement in games ($\beta = 0.18$) significantly predicted math knowledge.</p> <p>Frequency of parent-child involvement in number skills ($\beta = 0.21$), games ($\beta = 0.21$), and applications ($\beta = 0.24$) significantly predicted math fluency.</p> <p>The number of books was unrelated to outcomes.</p>	<p>Numeracy activities fell into 2 broad categories: direct activities that relate to acquisition of specific math skills (counting or recognizing digits) and indirect activities that have quantitative components (playing board games, measuring while cooking) but are not explicitly aimed at teaching math skills.</p> <p>Parents reported printing numbers and naming numbers as occurring less frequently than printing letters and naming letters.</p>
Family involvement at home LH	Maher, M. (2007). Home-school partnership with mathematics intervention. <i>Australian Journal of</i>	Year 1 (age 5) and Year 2 Longitudinal, intervention, nonrandomized	N = 30 New Zealand High SES	<p>Study about a math intervention for low-achieving 5-year-old children in one primary school and its effects on children's numeracy (NumPA — a diagnostic interview that allows children to demonstrate what their strategy stage is for: addition and subtraction, multiplication and</p>	<p>This small study found that most intervention children showed progress in terms of numeracy, but it did not compare the intervention group</p>

Appendix Table A.2

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
	<i>Early Childhood</i> , 32(3), 48-58.	Examined trends		<p>divisions, and proportion and ratio). The intervention was implemented for 15 of the lowest achievers in each of Year 1 and Year 2. Children were withdrawn from class 30 minutes per day for 20 weeks in small groups (3 groups of 5 students). Parents were involved in a “working bee,” whereby they were encouraged to reinforce math that their child would be learning at school and were provided with raw materials and helped make math equipment that could be used in the classroom. Children’s numeracy performance was examined at the beginning and end of the intervention.</p> <p>All but 3 severely developmentally delayed 5-year-old students progressed. Fewer Year 2 students progressed.</p>	<p>children with a comparison group. Nor was it able to directly compare intervention group and general students around New Zealand who also take the NumPA.</p>

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
Home learning environment LH	Melhuish, E. C., Phan, M. B., Sylva, K., Sammons, P., Siraj-Blatchford, I., and Taggart, B. (2008). Effects of the home learning environment and preschool center experience upon literacy and numeracy development in early primary school. <i>Journal of Social Issues, 64(1)</i> , 95-114.	PK to age 7 Longitudinal	N = 2,603 England	<p>Study examined the relationship between the home learning environment (HLE) and children's numeracy at age 5 (Early Number concepts subscale of the British Ability Scales [BAS] II) and age 7 (nationally standardized, teacher-conducted national assessment in math) as well as literacy at age 5 (Letter Recognition Test, Phonological Awareness assessment) and reading at age 7 (nationally standardized, teacher-conducted national assessment in reading). HLE was assessed as a composite of parent reports of the frequency that children engaged in activities with clear learning opportunities (for example, playing with letters or numbers; being read to; learning activities with the alphabet, numbers, or shapes). Models controlled for child-, family-, and center-level characteristics.</p> <p>HLE was positively associated with numeracy at ages 5 ($d = 0.65$) and 7 ($d = 0.50$) and with literacy at age 5 ($d = 0.73$) and reading at age 7 ($d = 0.60$).</p> <p>At age 5, children with higher HLE scores were more likely to be overachievers in literacy, while lower HLE scores were associated with underachievement. Effects were significant for numeracy but were not as strong.</p> <p>At age 7, lower HLE scores were associated with increased likelihood of underachievement in reading and math.</p>	HLE was moderately associated with SES and parents' educational beliefs ($r = 0.28$ to 0.32). Study also examined each HLE item as a separate predictor of over- or underachievement; playing with numbers had positive effects on unexpected achievement. Multilevel models for age 7 outcomes showed that links between HLE and achievement at age 7 were significant in only one direction: Unsupportive HLE was associated with increased likelihood of underachievement for reading ($d = 0.60$) and math ($d = 0.50$).
Home learning environment	Skwarchuk, S.-L. (2009). How do parents support	PK Longitudinal	N = 25 Canada	Study examined children's numeracy scores (Woodcock-Johnson Quantitative Concepts subtest) and home numeracy activities in several ways: (1)	Both basic and complex home numeracy activities

Appendix Table A.2

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
LH	preschoolers' numeracy learning experiences at home? <i>Early Childhood Educational Journal</i> , 37(3), 189-197.	Multiple regression	Predominantly Caucasian Mostly middle class	<p>parent reports of the frequency of basic and complex math activities at home, (2) parent diaries of math activities with their child (told to spend 10-15 minutes for 14 days using materials supplied), and (3) quality of parents' ability to draw out numerical content when playing with the child using a toy and a game in videotaped lab sessions.</p> <p>Exposure to complex numeracy-related activities positively predicted children's math scores ($\beta = 0.94$), controlling for child's age and parents' background.</p> <p>Exposure to basic numeracy-related activities negatively predicted children's numeracy scores ($\beta = -0.60$).</p> <p>Quality of PI, parent ratings of activity enjoyment, and time spent on numeracy tasks during home play sessions were unrelated to numeracy scores.</p>	(that is, going beyond counting) predicted preschool numeracy scores but in opposite ways. Diary descriptions and lab observations showed parents are able to introduce numerical content, but much of the content was not numeracy-related despite instructions to conduct math activities with their children.

Meta-Analyses (2 Articles)

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (N)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
Family-school interventions C	Bates, S. L. (2005). Evidence-based family-school interventions with preschool children. <i>School Psychology Quarterly</i> , 20(4), 352-370.	PK Effect sizes	Meta-analysis of 15 intervention studies representing over 3,400 students Participants in most of the studies were from low-SES backgrounds	Study synthesized 15 studies of family-school interventions with preschool children conducted between 1980 and 2002. More studies looked at social and emotional development than at academic factors, with one examining cognitive development (as measured by IQ). Effect sizes ranged from 0.16 to 0.19.	Family-school interventions with preschoolers are varied, target a range of problems and behaviors (conduct problems, academic development, cognitive development, social competence, parenting behavior, classroom management skills), and generally show positive effects of medium size.
Aspirations, communications, home supervision, participation at school C	Fan, X., and Chen, M. (2001). PIFI in students' academic achievement: A meta-analysis. <i>Educational Psychology Review</i> , 13(1), 1-21.	Various ages Effect sizes	Meta-analysis of 25 intervention and nonintervention studies representing over 130,000 students	Meta-analysis that integrated quantitative articles about the association between PI and children's academic achievement. PI variables included general involvement, parent-child communication, home supervision, educational aspirations and expectations for child, and school contact and participation. Achievement outcome variables included overall grade point average (GPA); GPA for math, reading, science, and social studies; test scores in math, reading, science, social studies, and music; and grade promotion and grade retention. Effect size = 0.18 for PI and students' math/quantitative achievement. The overall effect of PI on academic achievement was of medium size (about 0.30). PI (supervision of children at home) had the	Small-to-moderate association between PI and academic achievement. The association was stronger when academic achievement was represented by a global indicator like GPA than by a domain-specific indicator like math grades.

Appendix Table A.2

Form of Parental Involvement	Citation	Age of Sample / Study Design	Type of Study / Number in Sample (<i>N</i>)	Cognitive/Socio-Emotional/Behavioral Outcome	Overall / Other Results
				weakest relation with academic achievement ($r = 0.09$) and the strongest relation with parents' aspiration and expectations for children's educational achievement ($r = 0.40$).	

Appendix B

**Examples from the Field:
Family Involvement Activities with Young Children**

Based on research to date, which overwhelmingly reports positive results of family engagement on children's learning and development, many preschools and elementary schools are implementing involvement activities with families to strengthen children's reading and math skills and to improve the transition process to kindergarten. Appendix B summarizes a few of hundreds of activities that have been implemented by schools in the National Network of Partnership Schools (NNPS) at Johns Hopkins University and that are reported in annual books of *Promising Partnership Practices*. The tables below include a summary of each activity, the originating school, and the date published. They illustrate how educators are using NNPS training and guidelines to put research to work in action (Epstein, Sanders, Sheldon, Simon, Salinas, Jansorn, Van Voorhis, Martin, Thomas, Greenfield, Hutchins, and Williams, 2009).

Some caveats must be stated about the selected activities. Most importantly, no single activity to engage families with students in reading, math, or the transition from preschool to kindergarten will, by itself, improve students' reading or math skills or their attitudes or school-ready behaviors. Rather, the examples in Appendix Tables B.1, B.2, and B.3 are embedded in the schools' comprehensive partnership programs. Each activity can be one entry in a school's annual Plan for Partnerships linked to specific goals for creating a welcoming school climate, for improving children's reading or math readiness, or for preparing students and their families to transition to kindergarten. The schools that shared these practices also conducted other partnership activities during the school year. And schools' partnership programs are operating simultaneously with other efforts to improve teaching, the curriculum, instruction, and assessments of students.

- **Schools.** NNPS assists several hundred schools at any point in time, but not all schools remain active members of NNPS indefinitely. They may proceed to develop programs independently as they advance their expertise. Thus, the dates in the tables tell when the school reported the illustrative activity but not, necessarily, that the school continued the practice or is still being guided by NNPS. The activities, however, remain instructive for educators who want to know how other schools (at the same grade level or serving similar populations of students) have engaged families successfully.
- **Activities.** Some schools conduct the same activities every year and try to improve their design and conduct to engage more and different families. Other schools implement new activities from year to year to increase the variety of opportunities, attract new participants, and increase the depth and quality of the school's partnership program. For example, a preschool's "meet and greet" for teachers, parents, and newly enrolled students may be repeated with planned improvements to fulfill the purpose of welcoming each new group. By contrast, a school's Family Reading Night may change

genres each year (for example, from a focus on Mother Goose rhymes one year to nonfiction books on locomotion the next). Math nights may be repeated or may change themes (for example, from math in the circus one year to math in sports the next).

Programs and practices may improve from year to year as schools learn to solve challenges to reach all families. For example, NNPS guides schools to take seriously the fact that not all parents can attend meetings and events at school. Schools in NNPS are urged to consider ways to provide information from workshops and family nights to those who could not attend. (See, for example, Math Games at Home in Appendix Table B.2 for a school that is working to meet this challenge.)

Some activities were conducted with large groups of parents (perhaps all parents in the school) or with community members (for example, senior citizens come to read their favorite picture books with students). Other activities were conducted with one class or one grade level or targeted groups of parents and students (for example, first-graders demonstrate to parents math skills that meet state standards).

The activities reflect teamwork by teachers, parents, administrators, and others on each school's Action Team for Partnerships to engage all students' parents and other family members in ways that motivate, inform, and encourage family involvement and student learning. Some activities bring in "celebrities" (such as local sports figures, community leaders, and others) to reinforce the importance, joy, and fun of reading and math and the importance of school and learning.

The activities aim to establish a spirited and caring learning environment at school and to encourage parents and children to interact at home in ways that boost students' interests and skills in reading, math, and good behavior.

Links with the National Network of Partnership Schools (NNPS)

The schools listed in the tables are or have been members of the National Network of Partnership Schools (NNPS) at Johns Hopkins University. Schools in NNPS use a research-based framework of six types of involvement (parenting, communicating, volunteering, learning at home, decision making, and collaborating with the community) to organize comprehensive, goal-oriented programs of family and community involvement (Epstein et al., 2009).

Two schools with the same goal (for example, to increase students' reading readiness) may design and implement very different parental engagement activities. Their designs may be based on their students' starting skills and needs, the parents' backgrounds and cultures, or other demographic characteristics and circumstances. In NNPS, *each school is different* and must

customize its activities to meet its own goals for student achievement and success in school, but *all schools must establish important structures* (such as an Action Team for Partnerships, annual written goal-linked plans, evaluations) to organize and continually improve outreach to all families in ways that support student success in school. (See Epstein et al., 2009, for specifics on the essential elements of effective partnership programs.)

In addition to the sample activities in this appendix, over 1,200 other basic, advanced, innovative, and effective activities for the six types of involvement are reported in the annual books of *Promising Partnership Practices*, consisting of reports *from* NNPS schools *for* other schools (Thomas, Greenfeld, Sender, and Hutchins, 2012).

Family Involvement Literature Review

Appendix Table B.1

**Examples from the Field from Preschool to Elementary School:
Family Involvement Activities of Reading with Young Children**

READING: With parents and children reading together, these events reinforced that reading can be fun. They also increased parents’ abilities to interact with their children on reading-related activities at home and to become more actively involved at school.

Title of Activity (Alphabetically) Location Year Reported^a	Program’s Summary of Implementation	Grade Levels Goals / Purposes Number of Participants (If Reported)
<p>Almost Sleepover Early Childhood Family Education Center — Central School Road Saint Charles, MO 2010</p>	<p>Children and their families came to school clad in their pajamas for a night of reading, music, craft making, and snacks. They explored several themed rooms, each with a set of books, distinctive music, and a hands-on creative activity. For example: In the <i>Let’s Go Camping!</i> room, families toted flashlights into tents to read camping books. A recording of nature sounds played in the background, and parents and kids “toasted marshmallows” on pretzel sticks over a make-believe fire. The <i>Winter Wonderland</i> room featured winter-themed books, and children made coffee-filter snowflakes to take home. In the <i>Hush Little Baby</i> room, a lullaby played, and children and parents read good-night books, while resting on blankets on the floor. Other activities included making “family books” and working with Legos (guided by <i>Bob the Builder</i>). A librarian — strategically located in the same room as cookies, milk, and juice — distributed information to parents on literacy skill development and helped students and parents sign up for library cards.</p>	<p>Pre-K Parent-child time reading together Enjoy reading and connect reading with other hands-on activities Gather information from (and join) the public library N = 60</p>
<p>Dr. Seuss on the Loose Oconto Elementary School Oconto, WI 2008</p>	<p>Students and parents at Oconto Elementary School celebrated Dr. Seuss’s birthday at the school’s biggest reading event ever. <i>The Cat in the Hat</i> was there, as were guest readers, including the principal, librarian, and parents. Activities included a book walk, displays of student-published books, and other activities. Teachers and members of the Action Team for Partnership (ATP) talked with parents about strategies to encourage their children to read for pleasure at home. Each student created a</p>	<p>Early childhood to grade 4. Help students and families enjoy listening to stories, sharing books, and reading together Welcome parents to the school; provide information for them to encourage children’s reading at home</p>

Appendix Table B.1 (continued)

Title of Activity (Alphabetically) Location Year Reported^a	Program's Summary of Implementation	Grade Levels Goals / Purposes Number of Participants (If Reported)
	<p>bookmark with the help of local stamp business and received a book to take home, donated by the Parent-Teacher Organization (PTO).</p> <p>Snacks were served at the <i>Green Eggs and Ham Snack Shack</i>, and activities included the <i>Fox in Socks</i> sock-hop dance space with music by a local disc jockey.</p>	<p>Include community partners</p> <p>NOTE: Many schools conduct creative family reading nights in connection with Read Across America and Dr. Seuss's Birthday every March. In NNPS, these are not isolated activities but part of the comprehensive One-Year Action Plan for Partnerships, with other goal-linked involvement activities to advance children's reading, math, behavior, and other important outcomes.</p> <p><i>N</i> = 90 students, 120 parents</p>
<p>Family Literacy Night Roosevelt Early Childhood Center #65 Buffalo, NY 2009</p>	<p><i>Curious George, Mother Goose, The Cat in the Hat, and Old Mother Hubbard</i> wandered through Roosevelt Early Childhood Center telling their tales and talking with children and their parents. In the <i>Fairytales Theater</i>, some students performed <i>Goldilocks and the Three Bears</i> and <i>Little Red Riding Hood</i>.</p> <p>Also on the program were a book exchange, music and literacy presentations, and make-and-take activities. The Riverside Branch librarian was on hand to read aloud from award-winning children's books and helped children and adults apply for library cards. All books and reading activities were targeted to particular grade levels, from pre-K to grade 4.</p> <p>Teachers and parents met to talk about children's progress and needs in reading and how parents could support learning at home.</p>	<p>Pre-K to grade 4</p> <p>Enjoy rhymes, stories, and children's reading-related plays and presentations</p> <p>Spark students' interest in reading; increase parental involvement with children on reading</p> <p><i>N</i> = 125 students, 100 parents</p>
<p>Literacy Breakfasts Integrated Arts Academy Burlington, VT 2012</p>	<p>Breakfast and a book to read is a good way to start the day with food for strength and food for thought. At its Literacy Breakfasts, the Integrated Arts Academy (IAA) welcomed all parents to the classroom to reinforce the importance and enjoyment of reading.</p> <p>Children retrieved their individual "book boxes," which included about eight grade-level books. They elected to read one of their favorites to a parent, while enjoying breakfast together.</p> <p>To ensure that every student could participate in Literacy Breakfasts, children whose parent or guardian could not attend were invited to bring</p>	<p>Pre-K to grade 5</p> <p>Spotlight students' progress in reading aloud and talking about books at their reading levels</p> <p>Extend parents' information about the school's reading program and their child's progress in reading</p> <p><i>N</i> = 250 students, 180 parents</p>

(continued)

Appendix Table B.1 (continued)

Title of Activity (Alphabetically) Location Year Reported^a	Program's Summary of Implementation	Grade Levels Goals / Purposes Number of Participants (If Reported)
	<p>a sibling from another grade. Also, other adults in the building joined students who did not have a parent or sibling there.</p> <p>Literacy Breakfasts were held for pre-K to grade 2 in the fall and for grades 3 to 5 in the spring, each for about one hour. The planners used flyers, the school newsletter, a voice message from the principal, and individual phone calls to increase parents' attendance. Home-School Liaisons called families of English language learners in their languages to encourage them to attend. They also were there as interpreters to translate conversations between parents and teachers at the Literacy Breakfasts.</p>	
<p>Memory Makers T. H. Watkins Elementary School Lake Charles, LA 2009</p>	<p>One way to engage more families with children on reading and writing is with an activity that is <i>about</i> the uniqueness of each family. Parents and children brought their favorite family memories to the school's <i>Memory Makers Family Book Writing Event</i>.</p> <p>Students in pre-K to grade 5 engaged a parent in homework in whatever language was spoken at home to identify a family story and create a flowchart of the plot. In school, they wrote and illustrated the story. Using commercially available bookmaking kits, parents and children bound and "published" their family book. They read the story and shared it with other families. The school combined the Memory Makers event with a Book Fair to maximize attendance.</p>	<p>Pre-K to grade 5</p> <p>Link reading and writing by having parents and students write and illustrate a short book on a favorite family memory</p>

NOTE: ^aThe activities in Appendix B were conducted since 2008 by preschools, kindergartens, and/or elementary schools in the National Network of Partnership Schools (NNPS) at Johns Hopkins University. They were reported in annual books of *Promising Partnership Practices*. The schools planned their programs and practices using research-based training and tools in Epstein et al. (2009). Five activities were selected from hundreds of others on parental involvement with young children in reading, math, and the transition from preschool to kindergarten. See details on the practices, by year, at <http://www.partnershipschools.org> in the section "Success Stories in the Spotlight."

Family Involvement Literature Review

Appendix Table B.2

Examples from the Field from Preschool to Elementary School: Family Involvement Activities of Math with Young Children

MATH: Preschools and elementary schools that include pre-K and/or kindergarten invited parents and children to conduct grade-appropriate math activities together. The events reinforced that math is all around us and can be fun to do. The activities also helped parents feel welcome at their child's school, meet teachers, learn something about the math curriculum, and become more involved with their children at home on math. Some activities also encouraged parents to become involved at school in other ways.

Title of Activity (Alphabetically) Location Year Reported ^a	Program's Summary of Implementation	Grade Levels Goals / Purposes Number of Participants (If Reported)
Dads Involved with Youth Day (DIY) Timrod Elementary School Florence, SC 2012	One Saturday, pre-K through sixth-grade students and their dads, uncles, grandfathers, and male community volunteers worked together to practice math concepts and skills as they constructed their own birdfeeders. Community volunteers filled in for fathers who could not attend. Other volunteers included a local artist and carpenter to help where needed. At each step of construction, painting, and measurement, there were related math problems for the children to solve and submit. Teachers were on hand to meet the dads and to help students recall their skills in measurement, prediction, shape identification, and comparing angles. At the final measurement station, children measured birdseed donated by Lowe's and completed the final math problems. Children took home their completed birdfeeders along with their own donated tape measure and screwdriver set.	Pre-K to grade 6 Use math for real-world construction Increase involvement of dads and father figures N = 56 students, 48 fathers/father figures

(continued)

Appendix Table B.2 (continued)

Title of Activity (Alphabetically) Location Year Reported^a	Program's Summary of Implementation	Grade Levels Goals / Purposes Number of Participants (If Reported)
Family Night at Bottom Dollar Food Store Lee Hall Elementary School Newport News, VA 2010	<p>Lee Hall Elementary School took its Family Math Night to the grocery store. One evening, students in kindergarten through fifth grade and their parents went to the Bottom Dollar Food Store in their community. Each student received a grade-specific math activity with instructions about where to go in the store and what to do. For example, kindergartners were directed to the aisles to “Count the different types of edible dog/puppy treats” and record the numbers. They also were asked to “Find a pattern on this aisle and describe it to your parents.”</p> <p>The activities focused on patterns and shapes, weights and measurements, estimation, budgeting, and packaging and labels. An added bonus of the event was its timing — to reinforce math skills a week before the state achievement test was administered.</p> <p>Each child received a goody-bag and a book to take home. Adults received coupons and entered raffles for extra prizes. Refreshments were served; these were donated by the store as a school-community partner.</p>	<p>K to grade 5</p> <p>Apply math skills to real-world problems</p> <p>Increase the involvement of moms and dads in math-linked activities</p> <p>Build goal-linked community partners in a full partnership program</p> <p><i>N</i> (unreported)</p>
Having a Ball with Math Emerson Elementary School Pasco, WA 2011	<p>400 attendees (including students, moms, dads, and teachers) and a dozen community partners (including professional hockey players) gathered to use math while playing various sports and games. The planners linked sports for students at different age levels with grade-level math activities that were linked to state standards for math proficiency.</p> <p>A series of athletic games and stations included shooting hoops in the gym, bowling in the hallways, and playing hockey on an improvised rink in situations where addition, subtraction, and multiplication could be put to use. Also, the computer lab was open for parents and children to explore math sites and games that they could play at home on the Internet. In classrooms, games with math manipulatives were available.</p>	<p>Grades 1-5</p> <p>Link math with sports</p> <p>Inform parents about state math standards taught at each grade level and how to help children practice and use math at home</p> <p><i>N</i> = 400</p>
Make a Math Date with Your Child	<p>Parents were invited to their child’s math class to see the teacher and student in action and learn the math objectives and standards at each</p>	<p>Pre-K to grade 5</p> <p>Encourage parents to “see” math classes in action and</p>

Appendix Table B.2 (continued)

Title of Activity (Alphabetically) Location Year Reported^a	Program's Summary of Implementation	Grade Levels Goals / Purposes Number of Participants (If Reported)
Birdneck Elementary School Virginia Beach, VA 2009	<p>grade level. Teachers prepared hands-on math activities that adults and children could do together.</p> <p>Resource teachers and school administrators made presentations to parents about the school's math program. Each grade level had its own day so that parents with more than one child at the school could participate with each child. The school accommodated parents' busy schedules by hosting math class visits in both the morning and the afternoon.</p> <p>Parents and children received a packet of math games and activities and an Everyday Math deck of cards to play at home to reinforce specific math skills. Parents were invited to have lunch with their child before or after the math class.</p>	<p>learn about math standards for each grade level</p> <p><i>N</i> = 100 parents or caregivers</p>
Math Games at Home Edison Elementary School Kennewick, WA 2011	<p>Attendance at Edison's prior math night was high — about 50% of families attended — but the Action Team for Partnership (ATP) wanted to reach <i>all</i> families to connect them, the school, and children on math. Knowing that some parents simply cannot come to an evening event, the ATP and math teachers prepared clear and usable materials that were used at the <i>Math Game Night</i> for all families, whether they attended or not. They compiled a grade-specific list of math games and prepared take-home instructions and bags containing all pieces for everyone at the school.</p> <p>At Math Game Night, students practiced addition, subtraction, and other major math operations while having a great time with their parents and siblings. The attendees took their math games home to keep playing; other children took the math games home the next day.</p>	<p>Pre-K to grade 5</p> <p>Take the challenges of providing information and materials to those who could and could not attend Family Math Night</p> <p>Encourage parent-child interactions on grade-specific math games and skills at home</p> <p><i>N</i> = 400+ (all students' families)</p>

NOTE: ^aThe activities in Appendix B were conducted since 2008 by preschools, kindergartens, and/or elementary schools in the National Network of Partnership Schools (NNPS) at Johns Hopkins University. They were reported in annual books of *Promising Partnership Practices*. The schools planned their programs and practices using research-based training and tools in Epstein et al. (2009). Five activities were selected from hundreds of others on parental involvement with young children in reading, math, and the transition from preschool to kindergarten. See details on the practices, by year, at <http://www.partnershipschools.org> in the section "Success Stories in the Spotlight."

Family Involvement Literature Review

Appendix Table B.3

Examples from the Field from Preschool: Transition Activities with Young Children and Families

TRANSITIONS: When teachers reach out to inform and engage parents and children in activities to smooth the transition from preschool to kindergarten, more parents gain confidence about helping their children adjust to the new school, and more students enter kindergarten ready to learn.

Title of Activity (Alphabetically) Location Year Reported ^a	Program's Summary of Implementation	Grade Levels Goals / Purposes Number of Participants (If Reported)
<p>Kindergarten Boot Camp Alicia Cortez Elementary School Chino, CA 2010</p>	<p>The goal of Kindergarten Boot Camp was to help teachers plan instruction and to help parents prepare their children for school. At a required meeting with the kindergarten teacher, children completed individual assessments to show whether they could name letters, colors, and shapes and print their names. Parents filled out a readiness inventory for the teacher. It was clear that some students needed a jump-start to be ready for kindergarten in the fall.</p> <p>20 children were selected to attend a 2-week boot camp. Parents came once a week to observe how the children were learning the alphabet, poems, and songs and school skills, such as lining up and taking turns. The parents also discussed parenting strategies, including ideas for reading together at home. At the end of boot camp, teachers reassessed the students to determine how much their readiness skills had grown.</p> <p>All incoming kindergarteners and parents toured the school and classroom and received materials and guidelines to conduct readiness activities over the summer. All were given information on community programs and services (for example, library story time) that would increase reading and other school readiness skills.</p>	<p>Pre-K</p> <p>Give students an opportunity to “practice school”</p> <p>Increase basic reading readiness for new learning in kindergarten</p> <p>Prepare parents to reinforce school skills at home</p> <p><i>N</i> = 20 students and their parents in boot camp</p> <p><i>N</i> = 70 incoming students who took assessments</p>
<p>Kindergarten Connect Ann Reid Early Childhood Center Naperville, IL</p>	<p>Kindergarten Connect helped the parents of future kindergarteners to meet one another, ask questions, relieve anxiety, and learn about school requirements and academic programs for their children. Children in this Early Childhood Center will attend one of 14 elementary schools in the area.</p>	<p>Pre-K</p> <p>Learn about the child’s new school and meet teachers</p> <p>Meet other parents whose children will be attending the same kindergarten</p>

Appendix Table B.3 (continued)

Title of Activity (Alphabetically) Location Year Reported^a	Program's Summary of Implementation	Grade Levels Goals / Purposes Number of Participants (If Reported)
2012	<p>Volunteer translators, Home and School presidents, and School Family Community Partnership (SFCP) chairpersons from each elementary school conducted school-specific presentations and conversations with the parents of their incoming students. Parents also attended breakout sessions on Interventions, Social Skills, and Dual-Language programs. Parents also got a preview of a typical day at their child's future kindergarten.</p> <p>Ice breakers in each session helped parents meet each other.</p>	<p><i>N</i> = 100</p> <p>(NOTE: Another preschool provided videodiscs to all parents to introduce them to a typical day in kindergarten. [Roger Wolcott Early Childhood Center, Windsor, CT, 2011].)</p>
<p>Kinder Party Alfred F. Forrest Elementary School Hampton, VA 2012</p>	<p>Kinder Party was held to make the transition from Pre-K to K as smooth as possible. In May, parents and Pre-K students met the school's 5 kindergarten teachers and administrators to learn more about the school's programs and philosophy. Parents were guided to complete early kindergarten registration and were given math and reading readiness materials to use at home. Teachers and parents discussed school policies, procedures, and expectations for students, and parents' questions or concerns were addressed.</p> <p>Pre-K students and their parents visited interesting "stations" set up around the cafeteria and gathered information on registering for school, transportation and bus behavior, the cafeteria, the Parent Teacher Association (PTA), and services of the school nurse. As parents completed paperwork, children worked with the art teacher to make self-portraits for the "Growing Kindergarten" tree, which reflected the school's theme: The Place to Grow. The children also worked with the physical education teacher to play games using school sports equipment.</p>	<p>Pre-K</p> <p>Prepare for transition from Pre-K to K</p> <p>Help parents relate to the child's new school</p> <p>Provide readiness activities to use at home the summer before entering kindergarten</p> <p><i>N</i> = 50</p>
<p>Little Coyote Kinderbags Wilkinson Elementary School Williston, ND 2009</p>	<p>At a spring Open House for future kindergarteners, each child received a nylon backpack (decorated with a little coyote) filled with storybooks, a get-ready-for-kindergarten videodisc, word games, and other summer activities for parents and children to conduct at home. Parents who could not attend the Open House picked up a bag at the school or when they registered their child for kindergarten.</p> <p>Parents wanted to know what they could do at home during the summer before kindergarten to foster their children's success in school. The school and many community organizations contributed the information and activities in the bags. The bags also contained a postcard for parents'</p>	<p>Pre-K</p> <p>Provide resources: backpack for children and guidance for parents to conduct reading and math readiness activities at home</p> <p><i>N</i> = 180</p>

Appendix Table B.3 (continued)

Title of Activity (Alphabetically) Location Year Reported^a	Program's Summary of Implementation comments and suggestions.	Grade Levels Goals / Purposes Number of Participants (If Reported)
New Parent Orientation Valeska Hinton Early Childhood Center Peoria, IL 2008	<p>The <i>New Parent Orientation</i> helps parents prepare for the transition <i>into</i> preschool — the first major transition from home to school. The orientation is mandatory so that <i>all</i> parents receive vital information to support their children's success in school. Registration is not considered complete unless the parent has attended the orientation session on the school's program and education philosophy.</p> <p>At the end of the session, parents visit their children's classrooms where teachers address all parents' questions. Each teacher conducts a creative introductory activity with the parents of the children in that class. They also discuss and demonstrate all classroom routines, so parents can talk them over with their children.</p>	Pre-K Prepare for entrance to preschool, meet teachers, learn school routines Inform and engage parents to guide their children for entrance to preschool N = 100

NOTE: ^aThe activities in Appendix B were conducted since 2008 by preschools, kindergartens, and/or elementary schools in the National Network of Partnership Schools (NNPS) at Johns Hopkins University. They were reported in annual books of *Promising Partnership Practices*. The schools planned their programs and practices using research-based training and tools in Epstein et al. (2009). Five activities were selected from hundreds of others on parental involvement with young children in reading, math, and the transition from preschool to kindergarten. See details on the practices, by year, at <http://www.partnershipschools.org> in the section "Success Stories in the Spotlight."

Appendix C

Glossary

association: Two variables are associated with one another if some of the variability of one variable can be accounted for by the other variable. This association, or relationship, between two variables is not necessarily causal, and variables can be positively or negatively associated with one another.

attrition: a reduction in numbers, as when research subjects withdraw from a study after data collection begins. *Differential attrition* occurs when the subjects who withdraw have systematically different characteristics than the subjects who stayed in the study. Differential attrition may lead to bias (systematic error) and may impact the internal validity of a study — the degree to which observed changes can be attributed to the treatment or intervention and not to other possible causes.

bidirectionality: a relationship between two entities in which each influences the other; the actions of *X* impact the actions of *Y*, and the actions of *Y* impact the actions of *X*. For instance, the parent's behavior influences the child's behavior, and the child's behavior also influences the parent's behavior.

Childhood and Beyond! (CAB): a longitudinal study examining students' experiences in school, including achievement and learning. CAB data collection began in 1987 and reviewed students from kindergarten through twelfth grade, asking students about activities in school, behaviors, and beliefs. CAB looked at the development of students' and teachers' motivational beliefs, the relationship between motivational beliefs and the activities that children chose to participate in, and the influence of home and school factors on children. Over 12 years, there were nine waves of surveys and interviews with 850 children and with 65 percent of their parents. Student records were also collected and analyzed (Gender and Achievement Research Program, 2013).

chi-square: a statistic that tests for associations between variables. It compares observed data with data that we would expect to obtain according to a specific hypothesis. The statistic is calculated as the sum of the squares of the observed values minus the expected values, which is all then divided by the expected values.

covariate (or control variable): a secondary variable not of primary interest that can affect the relationship between the dependent variable and other independent variables of primary interest. It is included in the analysis to reduce the confounding effect of variations in the covariate that may also affect the value of the dependent variable.

correlation: a statistic that shows the degree to which there is a relationship between variables.

Early Childhood Longitudinal Program–Kindergarten (ECLS-K): a national, longitudinal study that follows children starting in kindergarten. There are two ECLS-K cohorts, one with the kindergarten class of 1998-1999 and one with the kindergarten class of 2010-2011. ECLS-K reviews child development, readiness for school, and early experiences in school, and it provides data on children's growth in school through eighth grade. ECLS-K also examines rela-

tionships impacting children's experiences, including the influence of the family, school, and community systems on children's development, learning, and school performance (Institute of Education Sciences, 2013a).

Early Head Start Research and Evaluation Project (EHSRE), 1996-2010: a national, large-scale, random assignment evaluation of the Early Head Start program, including both an impact evaluation and an implementation evaluation. The evaluation followed Early Head Start children and their families from when the children were born through when they were in elementary school. EHSRE included three phases, a Birth to Three Phase from 1996 to 2001, a Pre-Kindergarten Follow-Up Phase from 2001 to 2004, and an Elementary School Follow-Up Phase from 2005 to 2010 (Office of Planning, Research and Evaluation, 2013).

effect size: a statistical calculation that measures the magnitude of an effect. This statistic is often used to show the effectiveness of an intervention. The effect size is generally considered large if it is 0.8 (8/10 of a standard deviation unit), moderate if it is 0.5, and small if it is 0.2 (Cohen, 1988).

experimental study: a research design in which a treatment is applied to participants and then participants are observed to see the effect of the treatment. Participants with similar characteristics are randomly assigned into treatment and control groups, and the groups' results are compared. The treatment group receives the intervention, and the control group does not receive the intervention. Also see "nonexperimental study."

Head Start Family and Child Experiences Survey (FACES): a national, longitudinal study that follows a random sample of 3,200 children and families in 40 Head Start programs. FACES reviews the social, emotional, cognitive, and physical development of children in Head Start, along with the characteristics and achievements of the children's family, the quality of Head Start classrooms, and the characteristics and opinions of Head Start teachers and staff (Zill, Resnick, Kim, McKey, Clark, Pai-Samant, Connell, Vaden-Kiernan, O'Brien, and D'Elio, 2001). To date, there have been five FACES cohorts: 1997, 2000, 2003, 2006, and 2009 (Moiuddin, Aikens, Tarullo, West, and Xue, 2012).

hierarchical linear model (HLM): a multilevel statistical model that handles data in situations where observations are not independent of one another. That is, the data are "nested": Individuals are nested within larger units, which themselves are nested within other units. For instance, children are nested within classrooms, which are nested within schools. Also see "multilevel model."

intent-to-treat analysis: a method of analyzing a randomized controlled trial (RCT) that is based on an individual's initial assignment to treatment and not on the treatment that is actually received. Randomization is a sampling method in which subjects are randomly assigned to the treatment group or the control group. The intent-to-treat analysis strategy includes every subject who is randomized, regardless of whether the subject received the treatment; after randomization, all subjects are included in the analysis despite possible noncompliance, not meeting entry

criteria, early departure from the study, or any changes made in the protocol. Intent-to-treat methodology ensures that the treatment and control groups are similar.

longitudinal study: a research design in which the same subjects are followed and observed over a period of time.

mediator/mediating variable: a variable that accounts for, or explains, the relationship between two variables.

meta-analysis: a research design in which data that are gathered in separate but similar studies are systematically reviewed and combined in order to test the pooled data for statistical significance.

moderator/moderating variable: a variable that influences or changes the relationship between two variables, affecting the strength or direction of the relationship.

multilevel model: a statistical model that takes into account and can compare variables at several levels, such as at both the child level and at the school level. Also see “hierarchical linear model.”

National Education Longitudinal Study of 1988 (NELS 88): a longitudinal study following youth starting from when they were in eighth grade. The study surveyed a nationally representative sample of eighth-graders in 1988 and followed up on the sample in 1990, 1992, 1994, and 2000. The study also surveyed students’ teachers, parents, and school administrators. NELS 88 provides data on educational processes and outcomes, including learning, predictors of dropping out of school, and the effects of school on students’ ability to access programs and have an equal opportunity to learn (Institute of Education Sciences, 2013b).

National Institute of Child Health and Human Development (NICHD) Study of Early Child Care and Youth Development (SECCYD): formerly the NICHD Study of Early Child Care (SECC), this study began in 1991 and followed over 1,300 children and their families from when the children were babies until they turned 15. SECCYD examined how various child care arrangements impacted children’s health, behavior, performance in school, and other development indicators in infancy, early childhood, middle childhood, and adolescence (National Institute of Child Health and Human Development, 2012).

National Longitudinal Survey of Youth (NLSY): a longitudinal, nationally representative survey intended to provide data on the labor market activities and significant life events of youth. The NLSY79 is the survey of 12,686 men and women who were first surveyed in 1979, when they were between ages 14 and 22, and who continued to be surveyed every two years. The NLSY97 is the survey of 9,000 youths who were between ages 12 and 16 in 1996. For the NLSY97 cohort, both the youth and their parents were interviewed, and youth continued to be interviewed yearly (Bureau of Labor Statistics, 2013).

nonexperimental study: a research design in which there is no intervention or controlled environment and there is no manipulation of independent variables (items being measured that will not be changed by other variables); the preexisting situation is observed and measured in its natural state. Also see “experimental study.”

null finding (or null effect or null result): result that occurs when we fail to reject the null hypothesis (H_0). The null hypothesis states, for the comparison of the means of two groups, that the difference between the groups in the population is zero. This is commonly referred to as a “nonsignificant (*ns*) result.”

path analysis: a statistical method used to examine the causal relationships among variables and to determine the comparative strength of direct and indirect relationships among variables.

predictor: a variable that can be used to predict the value of another variable; also called an “independent variable.”

quasi-experimental study: a research design that tests the effectiveness of an intervention. This design is similar to an experimental design, but it does not include randomization: Subjects are not randomized into treatment and control groups, as described in “randomized controlled trial.”

randomized controlled trial (RCT): a research design in which subjects are randomly, yet methodically, assigned to either the group receiving the intervention (the treatment group) or to the group not receiving the intervention (the control group). The subjects in both groups are similar in every characteristic except for whether or not they receive the intervention. This research design is generally considered to be the most rigorous of all designs and is the gold standard of studies.

regression analysis: a statistical method that shows the relationship between two variables, such as an *independent variable* (an item being measured that will not be changed by other variables) and a *dependent variable* (an item being measured that can be changed by other variables). This method can predict the value of the dependent variable when the independent variable changes.

Study of Early Child Care and Youth Development (SECCYD): See “National Institute of Child Health and Human Development (NICHD).”

t-test: a statistical method that compares the means of two samples or compares a fixed value with the mean of a sample.

General References

NOTES: The references are in three sections. General References include all sources cited in the Executive Summary, Chapters 1 and 4, and the appendixes. These are followed by reading and literacy sources cited in Chapter 2 and then by math sources cited in Chapter 3. An asterisk (*) in the later two sections indicates that the study is discussed in this literature review.

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References for Chapter 2

Family Involvement in Reading and Literacy Activities and Results for Children's Literacy Achievement and Social-Emotional Skills

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References for Chapter 3

Family Involvement in Math Activities and Results for Children's Math Achievement and Social-Emotional Skills

NOTE: An asterisk (*) indicates that the study is discussed in Chapter 3 of this literature review.

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- Improving Public Education
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