

Chapter 3:
**The REDI-Parent Program: Enhancing the School Success of Children
from Low-Income Families**

*Karen L. Bierman, Robert L. Nix, Janet Welsh, Brenda S. Heinrichs,
John Loughlin-Presnal, & Meghan McDoniel*

Citation:

Bierman, K.L., Nix, R.L., Welsh, J.A., Heinrichs, B.S., Loughlin-Presnal, J.E., & McDoniel, M. (2022). The REDI-Parent program: Enhancing the school success of children from low-income families. In K.L. Bierman and S.M. Sheridan (Eds.), *Family-school partnerships during the early school years* (pp. 33-51). New York: Springer.

Acknowledgements:

This project was supported by National Institute of Child Health and Human Development Grant HD046064. We greatly appreciate the cooperation of our partners in this project: the parents, students, teachers, and program personnel of the Head Start programs of Huntingdon, Blair, and York counties in Pennsylvania and of the school districts that participated in the follow-up study. In addition, this work reflects the particular efforts and talents of Gloria Rhule and Julia Gest, who contributed to the home visiting program development and served as program supervisors.

Abstract

This chapter describes the Research-based, Developmentally-Informed Parent (REDI-P) home visiting program that was designed to support families of 4-year-old children attending Head Start through the transition into kindergarten. In REDI-P parents are provided with learning materials to use at home and coached in strategies to support child skill development in the dual domains of language-emergent literacy skills and social-emotional learning. A randomized trial documented significant benefits for children in kindergarten in areas of academic performance and social competence, and these benefits were sustained through third grade. Parents increased positive interactions and conversations with their children and reported higher academic expectations. By third grade, parents reported fewer child problems at home and less parenting stress. In addition to describing the program and its outcomes, this chapter describes links between initial program response (program engagement and intervention-related improvements in targeted competencies in kindergarten) and sustained benefits evident two to four years later, revealing the potential mechanisms of action and key factors that may account for the long-term benefits of parent engagement efforts at school entry. Implications of this research for the scaling of REDI-P and future design of similar family engagement programs are described, along with recommendations for next steps in this important area of research.

Keywords: family engagement, home visiting, school readiness, preschool intervention, parenting practices, kindergarten transition, academic performance, social-emotional learning, socioeconomic disadvantage, home learning

Approximately 4 million children start kindergarten in the United States each year, and many of them are not ready socially, emotionally, or cognitively for the challenges they will face at school. Children from low-income families are particularly vulnerable; fewer than half (48 percent) enter kindergarten with adequate readiness, compared to 75 percent of children from more economically-advantaged families (Isaacs, 2012). In fact, on average, children growing up in poverty start kindergarten with language and emergent literacy skills that are more than a full year behind their more advantaged peers (Committee on Integrating the Science of Early Childhood Development, 2000). Starting kindergarten with low readiness predicts elevated rates of later learning difficulties and behavior problems and an ongoing trajectory of low achievement (Ryan, Fauth, & Brooks-Gunn, 2006), creating a socioeconomic gap in school attainment that is now almost twice as large as the racial achievement gap (Reardon, 2011).

Based upon evidence that attending a high-quality preschool reduces the socioeconomic gap in school readiness, public investment in preschool programs has increased substantially over the past two decades, with a primary goal of enriching early learning opportunities for economically-disadvantaged children (Yoshikawa et al., 2013). At the same time, long-term benefits are disappointing; a recent review of 67 high-quality early childhood interventions showed academic benefits fading over time, with half of the pre-literacy and early math benefits associated with preschool attendance fading within a year of elementary school entry and another half of the benefits fading again two years later (Bailey, Duncan, Odgers, & Yu, 2017).

This chapter describes the Research-based, Developmentally-Informed Parent (REDI-P) program which was designed to increase the sustained benefits of high-quality preschool programming by engaging parents and strengthening home learning support as children made the transition from Head Start into elementary school. We provide a brief overview of the

developmental research that informed the REDI-P program design, identifying factors associated with early socioeconomic disadvantage that negatively affect the developing brain, along with intervention strategies that can boost families' capacities to buffer children and support early development and school readiness. We then review outcomes from a randomized-controlled trial demonstrating the efficacy of REDI-P in promoting neurodevelopment and school readiness and supporting gains in academic and social-behavioral school adjustment still evident at follow-up assessments conducted when children were in third grade, four years after intervention. We also present analyses that illustrate potential mechanisms of intervention action, with implications for future research and for intervention refinement and scaling.

Developmental Research Informing the REDI-P Intervention Design

The striking socioeconomic disparities in social, emotional, and cognitive domains of school readiness that are apparent at school entry appear multiply-determined, reflecting the negative developmental impact of adversities associated with growing up in poverty (Ryan et al., 2006). Limited financial resources often result in living conditions that are crowded and unsafe, with reduced access to high-quality child-care and early education supports. Low levels of parent education, along with elevated rates of maternal depression, family instability, and single-parenthood all diminish parents' abilities to provide consistent, sensitive-responsive, and cognitively-stimulating parenting support (Ryan et al., 2006). Exposure to these chronic stressors has an adverse impact on the development of key child skills that support adaptive functioning and learning, including the social-emotional skills that promote positive relationships with adults and peers, and the self-control skills that enhance impulse and attentional control (Blair & Raver, 2015). Concurrent delays in language and cognitive skill development often emerge as a function

of reduced exposure to adult language use that includes complex oral vocabulary and syntax, and low levels of parent-child reading and book access (Senechal, 2006).

Integrating interventions to enrich social-emotional and language development.

Recognizing the multifaceted nature of the skill delays associated with early socioeconomic disadvantage, an initial REDI preschool enrichment program was designed with a dual focus on supporting social-emotional learning and language-emergent literacy skills. The REDI classroom program (REDI-C) provided Head Start teachers with manualized enrichment curricula and mentored professional development opportunities. To support the acquisition of social-emotional and self-control skills, REDI-C used the Preschool PATHS (Promoting Alternative Thinking Strategies) curriculum (Domitrovich, Cortes, & Greenberg, 2007) which provides classroom lessons and teaching support for social-emotional and self-regulatory skill development. To enhance language and emergent literacy skills, REDI-C also included an interactive reading program, using stories linked with PATHS themes to reinforce social-emotional understanding, along with a sound games program to build phonological awareness and alphabet center activities to strengthen print knowledge.

REDI-C's integrated focus on social-emotional learning and language-literacy support proved effective. A randomized-controlled trial demonstrated gains in both domains of child skills at the end of the prekindergarten year (Bierman et al., 2008). However, effects on language and literacy skills largely faded by the end of kindergarten, although social-emotional benefits were sustained (Bierman et al., 2014; Welsh, Bierman, Nix, Heinrichs, & Gest, in press.) Subsequent analyses suggested that the REDI-related gains in social-emotional competencies and language-emergent literacy skills had synergistic benefits for children when they entered kindergarten (Nix, Bierman, Domitrovich, & Gill, 2013), but that kindergarten instructional

practices and teaching quality largely accounted for literacy skill growth after school entry (Bierman et al., 2014).

Logic model for the REDI-P intervention. REDI-P was designed to reduce the fade-out associated with preschool classroom enrichment and provide on-going support for child school adjustment by helping parents scaffold learning at home as children made the transition from preschool to elementary school. REDI-P extended the REDI-C emphasis from the classroom into the home to reinforce support for child social-emotional and language-literacy skill development. In designing strategies to support parents, REDI-P incorporated two distinct approaches for enhancing family-focused engagement that had proven effective in prior studies.

One of these approaches emphasized the use of parent-child learning activities designed specifically to support child skill acquisition. For example, prior research had demonstrated that teaching parents how to read interactively with their children (e.g., asking questions and using active listening to extend parent-child conversations about the pictures and stories) produced significant increases in receptive and expressive language skills (see reviews by Manz, Hughes, Barnabas, Bracaliello, & Ginsburg-Block, 2010; Mol, Bus, DeJong, & Smeets, 2008; Reese, Sparks, & Leyva, 2010). Similarly, providing parents with games and activities that exposed children to letter and letter-sound identification (Evans & Shaw, 2008) and showing parents how to point out print while reading (Justice & Ezell, 2000) boosted child emergent literacy skills and, in some cases, also enhanced their social-emotional skills (Ford, McDougall, & Evans, 2009).

A second intervention approach focused on enhancing the parent-child relationship and increasing parents' use of interaction strategies associated with positive child social-emotional development and behavioral adjustment (e.g., sensitive-responsive interaction, positive behavior

management strategies, decreased directiveness and punitive responding; see Webster-Stratton & Taylor, 2001 for a review). Preschool interventions focused on promoting positive parenting have proven effective in improving child classroom behavior (Webster-Stratton, Reid, & Hammond, 2001) and in some cases have also promoted gains in child language and social skills (Landry, Smith, Swank, & Guttentag, 2008; Lunkenheimer et al., 2008).

REDI-P intervention design. REDI-P incorporated both of these approaches to parent engagement. During ten home visits scheduled in the spring of the prekindergarten year and six home visits scheduled during the fall of the kindergarten year, REDI-P provided parents with a prepared home learning curriculum and guidance regarding optimal teaching strategies. Monthly activity kits contained storybooks, guides and props for parent-child dramatic play activities, conversation games, and literacy-focused games and activities. In alignment with the REDI-C program, REDI-P stories and games featured the characters introduced in the PATHS curriculum, emphasizing cooperation, caring, compliments, emotional understanding, and self-control (Domitrovich et al., 2007). Storybooks were written at a very basic literacy level, with embedded questions to help parents read interactively. Pretend play activities (supported with props and picture guides) featured letter and letter-sound identification practice; for example, playing restaurant included menus and alphabet placements, and playing post office involved drawing and writing notes to family members (for more details, see Bierman, Welsh, Heinrichs, Nix, & Mathis, 2015).

In addition to providing home learning materials, home visitors coached parents in strategies designed to support social-emotional learning (e.g., positive behavior management, emotion coaching, and the use of planned routines and social problem-solving dialogue) and strategies to enhance home language use and extend parent-child conversations (e.g., asking

questions, using active listening, expanding on child statements). During their visits, home visitors used modeling videotapes, “parenting tips” handouts, discussion, and reflection activities to help parents become comfortable with these parenting strategies and customize their use to fit family preferences. In addition, at three time points during the intervention, parents were videotaped with their children using program materials and interaction strategies. These videotapes were reviewed by the parent and home visitor to highlight positive aspects of the parent-child relationship and reflect collaboratively on areas for trouble-shooting and improvement. The logic model guiding the design of REDI-P and its hypothesized change processes is illustrated in Figure 1.

REDI-P Evaluation: Immediate and Longer-Term Outcomes

The impact of the REDI-P program was evaluated in a randomized-controlled efficacy trial. Participants included 200 four-year old children recruited from Head Start classrooms using the REDI-C curriculum (55% European American, 26% African American, 19% Latinx, 56% male), age 4.45 years old at time of enrollment ($SD = .29$). Reflecting the Head Start population, families were generally low income (median annual family income = \$18,000), with 54% of parents unemployed, and 39% single. Families were randomly assigned to receive REDI-P (intervention condition) or an alternative set of learning materials through the mail (control condition). All participating children were receiving the REDI-C program enrichments in the classroom; hence, this study examined the added value of extending the REDI curriculum into the home (REDI-P) beyond exposure to REDI-C alone.

Sixteen percent of the participating families spoke Spanish as their primary language; all of these families also spoke some English at home. These families were provided with a Spanish-speaking home visitor and were offered the home learning materials in Spanish. However, all

families opted to use English materials when working with their child, no doubt influenced by the fact that their children would be entering schools where classroom instruction was provided only in English.

Home visitors were recruited from the communities where Head Start centers were located. All had undergraduate degrees in early education or human services and experience working with parents of young children. Home visitors received four days of workshop training and followed a manualized protocol during visits. Each week the home visitors participated in a group conference call with the program supervisor to review upcoming program activities and intervention protocol; in addition, weekly individual supervision calls provided home visitors with guidance in their work with specific families. The program supervisor attended 20% of the home visits to assure standard implementation across the home visitors.

Children were widely dispersed after Head Start, transitioning into 149 kindergarten classrooms in 74 schools. Children were followed longitudinally by the research team, with assessments conducted at the end of the intervention (kindergarten) and during the subsequent years of elementary school (grades 1, 2, and 3). Measures included direct assessments of child skills, along with teacher and parent ratings of child adjustment.

Parent engagement in intervention. Home visitors completed regular logs, noting home visit completion and their perceptions of parent interest, use of program materials and parenting strategies, understanding of the parenting skills, and general openness to consultation. Out of 16 planned home visits, parents completed 12 sessions on average ($SD = 5.48$, range = 0 – 16). A majority of families (66%) completed at least 75% of the planned sessions (12 – 16 visits) and another 13% of the families completed at least 50% of the sessions (8-11 visits). A small number of families (13%) were minimally engaged in the intervention and completed 3 or fewer visits.

These are high levels of attendance relative to the average rate of 50% attendance that characterizes many parent-focused intervention programs (Dumas, Nissley-Tsiopinis, & Moreland., 2007; Webster-Stratton et al., 2001). We attribute the levels of attendance to several factors, including scheduling home visits at times selected by families (thereby reducing barriers to attendance), embedding REDI-P in the framework of the Head Start system which encourages and supports parent involvement, and providing the intervention at a time when parents were anticipating their child's transition into kindergarten and had both hopes and concerns that motivated interest in support strategies.

Ratings made by home visitors were scored to reflect two dimensions of intervention engagement (see Nix, Bierman, Motamedi, Heinrichs, & Gill, 2018). Ratings of parent interest in and comfort with the intervention, openness to consultation, and understanding of the intervention strategies were averaged across all sessions to represent the quality of working alliance between the parent and home visitor. Overall, families showed relatively high levels of a positive working alliance, with a mean of 2.42 out of 3.00 ($SD = 0.59$), but there was variability in the sample, with a range from 0.67 to 3.00. Ratings of the parent's use of the home-based learning activities and teaching strategies were averaged across all sessions to reflect their use of program materials during the time between home visits. More variability emerged on this dimension of engagement with a mean of 1.72 out of 3.00 and a range of 0 to 3.00. Most parents (49%) used the home learning materials at a moderate level (e.g., some of the materials being used some of the time during the week), and another large portion of the sample (38%) used the materials frequently (e.g., most of the materials being used several times per week). The rest of the sample (13%) showed little to no use of the materials. Correlations among the dimensions of intervention engagement revealed that attendance was only mildly correlated with working

alliance ($r = 0.30$) and use of program materials ($r = 0.23$), but working alliance and use of program materials were more highly correlated ($r = .71$).

Kindergarten outcomes. Cross-classified hierarchical linear models (nesting children within their Head Start classrooms and elementary school districts) were used to evaluate child and parent outcomes at the end of the intervention when children were in kindergarten, using demographics and pre-intervention baseline scores as covariates (Bierman et al., 2015). Relative to the control group who received only REDI-C, children who received REDI-P and REDI-C showed significantly higher scores on direct assessments of child emergent literacy skills ($d = .25$) and teacher-rated academic performance ($d = .28$) in kindergarten. They also showed higher levels of self-directed learning ($d = .29$) and social competence ($d = .28$) as rated by teachers. Parents who received the REDI-P intervention reported reading in a more interactive way with their children ($d = .28$) and having longer and more frequent conversations with their children ($d = .27$) than parents in the control condition. Interestingly, REDI-P also boosted parent's confidence in their children's ability to succeed in school, significantly increasing their expectations for their children's future grades and academic attainment ($d = .32$; Loughlin-Presnal & Bierman, 2017). On average, these effects for children and parents were moderate in size, roughly one-fourth of a standard deviation higher for families in the intervention versus control group. They demonstrate that adding a family engagement intervention (REDI-P) to cover the transition between a preschool classroom enrichment (REDI-C) and kindergarten entry significantly increased parent support for learning at home and significantly improved benefits to children in key areas of academic and social-emotional school adjustment.

Third grade outcomes. Study children were followed as they moved through the elementary school grades to determine whether REDI-P benefits were sustained in later grades.

Hierarchical linear models with children nested within their Head Start classrooms were conducted on child assessments collected at the end of third grade revealed sustained effects. Relative to children in the control condition, children in the intervention condition continued to show significantly higher scores on direct assessments of child literacy skills ($d = .28$) and teacher-rated academic performance ($d = .29$) at the end of third grade (Bierman, Welsh, Heinrichs, & Nix, 2018.) Children in the REDI-P intervention condition also showed higher third-grade scores on observer ratings of task orientation ($d = .45$) and direct assessments of social understanding ($d = .31$) reflecting sustained effects in areas of adaptive approaches to learning and social competence respectively. Although the specific measures included in the initial kindergarten and third grade follow-up analyses differed, these findings illustrate sustained effects of a similar magnitude in both the academic and social-emotional domains through third grade (see Figure 2).

In addition to these sustained child benefits, parent ratings at third grade revealed additional benefits at home. Parents who received REDI-P reported fewer child problems at home than parents in the control condition ($d = -.28$) and they reported corresponding reductions in their experiences of parenting stress and hassles ($d = -.27$). These are important findings regarding the degree to which boosting effective parent engagement at the critical developmental point of kindergarten transition can extend and augment preschool classroom enrichment. Not only did child school adjustment show sustained improvements in academic and social-emotional domains, but parent-child relationships also benefitted over time.

Exploring Potential Mechanisms of Action in the REDI-P Intervention

These findings are exciting, but it is important to keep in mind that REDI-P represents a fairly intensive parent engagement program. A careful cost analysis estimated the cost per family

at \$2,491 for the 16-session home visiting program (Jones, Bierman, Crowley, Welsh, & Gest, 2019). The intensity and cost of the program represent potential barriers to wide-scale implementation, leading to questions about whether the program could be modified to simplify (and reduce) implementation costs without significantly reducing impact. To guide possible modifications of the intervention, analyses were undertaken to explore intervention mechanisms of action. The goal was to better understand whether certain components of REDI-P may have played a more central (or more peripheral) role in contributing to its positive impact. In the following sections, we describe these post-hoc exploratory analyses and their implications for future intervention design refinement and research.

First, analyses were conducted within the intervention group to understand variation in parent engagement in and response to REDI-P, including baseline family characteristics that predicted intervention engagement, and associations between intervention engagement and child outcomes (Nix et al., 2018). A second set of analyses was then conducted to explore links between initial intervention response and later child and family benefits, illuminating possible mechanisms of action supporting sustained effects for REDI-P (Bierman, McDoniel, & Loughlin-Presnal, in press).

Predictors of intervention engagement. As noted above, families living in poverty often experience multiple adversities that impede their ability to provide consistent, positive, and stimulating educational support for their young children. We wondered whether these adversities might also reduce parent engagement in REDI-P. Within the intervention group, we tested the degree to which three baseline family factors associated with adversity (parent education levels, unemployment, and parent depressive symptoms) predicted intervention engagement. We also looked at three factors that might make parent-child interaction more difficult or less rewarding –

the degree of warmth observed in the parent-child relationship, child attention problems, and child behavior problems.

Correlations were computed to determine how each of these baseline family characteristics predicted the three dimensions of intervention engagement. None of the family characteristics studied predicted rates of intervention attendance, although families who were white and lived primarily in rural counties attended more sessions on average ($M = 13.72$) than families of color who lived primarily in urban areas ($M = 10.79$). The lack of association between other family characteristics and home visit attendance may be due to the efforts of home visitors to reschedule visits as needed, resulting in a majority of families (79%) receiving at least 50% or more of the intervention.

Somewhat surprisingly, none of the baseline parent characteristics studied (e.g., parent education, employment status, or depressive symptoms) predicted the quality of the working alliance in REDI-P, nor did parent race/ethnicity. However, the working alliance was significantly promoted by the three baseline factors reflecting parent-child functioning: the warmth of the parent-child relationship ($r = 0.37$), child attention skills ($r = 0.21$), and low levels of child behavior problems ($r = 0.23$). Prior studies have identified low parent education, being a parent of color, maternal depression, and severity of child behavior problems as predictors of lower levels of working alliance and quality of participation in parent group interventions (Baydar et al., 2003; Nix et al., 2009). Because REDI-P was delivered individually and not in group sessions, home visitors had more latitude to adjust their support to better align with the needs and preferences of parents who varied in education level, cultural beliefs, and family context, thereby reducing the extent to which these factors attenuated parent connection with the home visitor or interest in the intervention. Even so, parent enthusiasm and uptake of the REDI-P

intervention appears reduced by child characteristics and parent-child relationship difficulties that made home learning activities and intervention strategies more challenging and less rewarding to implement.

A very similar set of baseline characteristics predicted the degree to which families used REDI-P home learning books and activities in between home visits, which were promoted by fewer parent depressive symptoms ($r = -0.23$), higher warmth in the parent-child relationship ($r = 0.30$), better child attention skills ($r = 0.34$), and fewer child behavior problems ($r = 0.35$). On the one hand, these findings suggest that REDI-P was successful at mitigating many of the barriers to parent engagement that occur in the face of the adversities associated with poverty. On the other hand, these findings suggest that parents were most enthusiastic about REDI-P parenting strategies and active in using REDI-P home learning materials when they had a warmer relationship with their child at the start of the program, and when their child was more easily engaged.

Predictive associations between intervention engagement and child outcomes. The next set of analyses explored the degree to which the three dimensions of parent engagement predicted subsequent child acquisition of the targeted academic and social-emotional skills. Hierarchical multiple regression equations were estimated to isolate the unique effect of each dimension of intervention engagement (e.g., attendance, working alliance, use of home learning materials) on each child outcome. In these analyses, baseline family characteristics and child skills (e.g., emergent literacy skills, attention skills, behavior problems) were entered first to control for pre-existing differences that might affect both intervention engagement and child outcomes. Two sets of child outcomes were examined: 1) those reflecting the immediate post-intervention school functioning of children in kindergarten, and 2) those reflecting later school

functioning of children at the second-grade follow-up assessments (for more details see Nix et al., 2018).

The regression equations predicting kindergarten outcomes revealed one significant effect for intervention attendance, as it uniquely predicted improvements in children's behavior at home. Somewhat surprisingly, the working alliance did not uniquely predict any of the child outcomes in kindergarten. In contrast, use of the program materials at home significantly predicted multiple kindergarten outcomes – improved child literacy skills and attention skills at school and reduced behavior problems at home. Thus, parent use of the home learning materials emerged as the most important unique feature of program engagement contributing to immediate child outcomes assessed at the end of kindergarten.

However, a somewhat different picture emerged when the measures of parent intervention engagement were used to predict sustained child outcomes at the second-grade follow-up assessments. In these regression equations, neither intervention attendance nor use of program materials were significant unique predictors of outcomes. Instead, the quality of the working alliance emerged as the significant unique predictor of second grade language arts skills (e.g., reading and writing), attention skills, and social competence.

This switch in the engagement dimensions that uniquely predicted outcomes may be best understood by taking a developmental perspective. The home learning activities used during the intervention period were selected to support the acquisition of the literacy-language and social-emotional skills children would need at kindergarten entry. In this way, these learning activities were limited in their developmental scope. In contrast, the REDI-P parenting strategies had more developmental generalizability, including strategies useful for enriching parent–child conversation, improving parent–child interaction quality, and increasing cognitive stimulation. A

good working alliance between parents and home visitors likely contributed to parents' deeper understanding and acceptance of the REDI-P approach to learning support. In turn, that deeper understanding and acceptance may have allowed parents to generalize REDI-P strategies to new challenges their children faced after the end of the intervention period. Hence, children made early gains as long as parents used the learning materials REDI-P provided; however, sustained benefits required greater reliance on broader parenting strategies related to learning support.

Given the high correlation between use of home learning materials and the home visitor-parent working alliance ($r = .71$), it is likely that these facets of intervention engagement were intertwined and interdependent. Having concrete activities to use at home may have provided important scaffolds for initial parent behavior and attitude change (and boosted immediate child skill acquisition). More frequent parent use of the materials likely increased parent reflections on and conversations with the home visitors about the parenting strategies that seemed effective with their children, and likely enriched problem-solving discussions and tailoring of parenting strategies to fit the child's needs and parent preferences. These reflections and discussions about the parent-child interaction strategies may have increased parent feelings of efficacy in their general use, thereby fostering longer-term use and adaptation, contributing to sustained gains in child functioning. Together these analyses suggest that both facets of intervention engagement played important and unique roles in supporting positive child outcomes. Beyond promoting sufficient intervention attendance, working alliance and use of program materials are both important to optimize initial and longer-term child outcomes.

Associations between initial REDI-P response and sustained benefits. Another way to explore the relative utility of the dual-pronged REDI-P program focus on building child skills and coaching parenting strategies was to examine the relative contributions of initial gains in

child and parenting skills to the later intervention outcomes that were sustained in third grade. These additional analyses were conducted using both the intervention and control groups.

Conceptually, the dual focus of REDI-P might contribute to sustained benefits for children by strengthening either child skills or enhancing parenting strategies (or both). For example, by promoting child skills, REDI-P might enhance child success at school entry, increasing opportunities for positive socialization and learning at school (or reducing socialization and learning risks), thereby setting children on more positive developmental trajectories (Bailey et al., 2017; Sandler, Schoenfelder, Wolchik, & MacKinnon, 2011). Alternatively or in addition, REDI-P might enhance parenting skills that generalize over time, extending parent capacity to support positive child development and home support for learning in subsequent years and thereby producing sustained benefits (Reid, Webster-Stratton, & Baydar, 2004; Webster-Stratton & Taylor, 2001). Researchers have also suggested that parent-focused interventions might improve parental self-efficacy, thereby fueling more positive and engaged parenting efforts in subsequent years (Sandler et al., 2011).

A set of multilevel path analyses using structural equation models tested three areas of REDI-P post-intervention gains as potential mediators of third grade sustained effects: 1) child emergent literacy skills, 2) child social-emotional skills (e.g., social competence, self-directed learning), and 3) parenting strategies (e.g., parent-child conversations, reading quality) and efficacy (parent academic expectations). Separate mediation models were run for third grade outcomes in the four areas of child academic performance, social-emotional functioning, child problems at home, and reduced parenting stress. These models included multiple covariates to control for possible confounders, including demographics and baseline measures of child skill (Bierman et al., in press).

The first model revealed that sustained intervention effects on child academic performance were significantly mediated by initial intervention gains in child emergent literacy skills and parent academic expectations, which together accounted for 34% of the total third grade intervention effect. A second model revealed that sustained intervention effects on child social-emotional competence were significantly mediated by initial intervention gains in child social-emotional competence, which accounted for 50% of the third-grade intervention effect. The third model revealed that sustained intervention effects on child problems at home were significantly mediated by initial intervention gains in child social-emotional skills, parent-child conversations, and parent academic expectations, which accounted for 60% of the third-grade intervention effect. Finally, the fourth model revealed that sustained intervention effects on parenting stress were significantly mediated by initial intervention gains in child social-emotional skills and parent-child conversations, which accounted for 37% of the third-grade intervention effect.

These analyses validate the multi-faceted approach of REDI-P, suggesting that the dual focus on building child skills and enhancing parenting strategies, along with the dual emphasis on social-emotional learning and language-literacy skills produced sustained benefits through multiple pathways. Of particular importance to later outcomes were the initial intervention effects on child social-emotional skills, including social competence and adaptive approaches to learning. Initial gains in this domain were sustained within domain, and they also made unique contributions to later reductions in child behavior problems and parenting stress. Home learning curricula have traditionally focused primarily on academic skills (e.g., Manz et al., 2010; Mol et al., 2008; Reese et al., 2010). The current findings validate this emphasis, as initial intervention gains in the area of emergent literacy skills uniquely contributed to sustained gains in the same

domain. However, the findings also suggest that an integrated intervention emphasis on stories, games, and activities that have social-emotional content and support parent-child conversations about feelings and problem-solving may be uniquely valuable for children growing up under conditions of adversity.

It is notable that the initial gains in high-quality parent-child conversations and parent academic expectations played a critical role in supporting longer term improvements. Several prior studies have documented that improving positive parenting and behavior management skills lead to reductions in child conduct problems (Brotman et al., 2009; Reid, Webster-Stratton, & Baydar, 2004). REDI-P showed something similar, but only for parents with low levels of warmth at baseline (Bierman & Mathis, 2015). In general, about 25-30% of children attending Head Start have problems with impulsive, oppositional, and aggressive behaviors (Reid et al., 2004). Families who struggled with those child behavior problems sometimes found REDI-P difficult to implement. They may have benefitted more from a parent management training prior to a learning support program like REDI-P. For the larger majority of Head Start families who were not struggling with elevated child behavior problems and were able to implement and enjoy the REDI-P reading and learning activities with their children, this home learning enrichment promoted sustained gains in social-emotional, self-regulation, and language competencies, fueled by enhanced parent-child communication skills and parent feelings of hope and efficacy regarding their child's academic potential.

Implications of REDI-P Findings for Future Intervention Design and Research

Despite strong evidence of its efficacy in reducing socioeconomic gaps in child school readiness and school success, REDI-P has several features that are likely to limit its broad diffusion. In particular, the intensity and cost of the intervention services are likely to reduce

program use. One of the goals of examining how (and for whom) REDI-P worked in order to inform future intervention design and research. A better understanding of intervention mechanisms of action could guide future design efforts by suggesting critical intervention features that should be maintained in future adaptations as well as identifying aspects of the intervention that might be streamlined. In the following section of this chapter, we consider the implications of the research completed to “unpack” the active mechanisms driving REDI-P effects for future program adjustments. We also consider additional research that is needed on REDI-P and similar family engagement programs.

Critical intervention features accounting for beneficial effects. In large part, REDI-P’s positive effects were attained by engaging parents effectively in home learning activities that were easy and fun for parents to use and designed to support the child’s acquisition of key social-emotional and emergent literacy skills. Analyses suggest that the use of these home learning activities functioned as a critical lever promoting child skill acquisition and provided parents with concrete guides for how to interact with their children in ways that promoted parent-child communication and child learning. Analyses further suggest that coaching by the home visitors in parenting strategies designed to support social-emotional learning (positive behavior management, emotion coaching, and the use of planned routines and social problem-solving dialogue) and strategies to enhance home language use and extend parent-child conversations (questions, active listening, expansions) contributed to the sustainability of child gains. The integrated approach of REDI-P with its focus on boosting child social-emotional and language-literacy skills also appears validated in the REDI-P analyses. Hence, these three elements (e.g., use of scaffolded home learning materials, coaching support in parenting strategies, and integrated focus on child social-emotional and language-literacy skills) likely represent the

central features of REDI-P that account for its benefits and should be maintained in any future program adaptation.

At the same time, there are several other aspects of REDI-P design that might possibly be modified without reducing the benefits. Next, we consider these aspects of intervention design and the future research needed to explore them.

Delivery system and dose. The most expensive element of REDI-P is the provision of 16 home visits to each family. Interestingly, the number of home visits that parents received was not significantly associated with their use of the home learning materials or their working alliance, nor with child outcomes (with the exception of reduced behavior problems at home). These findings suggest that it might be possible to attain similar results with fewer home visits, particularly for parents who were not struggling with child behavior problems at home and who found the learning materials and teaching strategies easy to use. At the same time, most families received 12 home visits, so determining the number of visits needed to produce beneficial effects is a topic that requires future research. It would also be less expensive to deliver REDI-P coaching in an alternative format, such as a parent group workshop or via on-line demonstrations rather than in-person home visits. These alternative formats would reduce the amount of personalized coaching that could be done but might still be effective in generating parent self-reflection and strategy understanding. Future research is needed to determine the potential benefits of delivering REDI-P with a less costly delivery system than individual home visits.

Use of a tailored or adaptive intervention design. In a tailored or adaptive intervention design, the content, length, or nature of the intervention is altered based upon the characteristics or response of individual families (Collins, Murphy, & Bierman, 2004). The implementation research presented here suggests that families with strained parent-child relationships and

difficulties managing child behaviors at home struggled to use the home learning materials and REDI-P parenting strategies effectively with their children. Additional research documents that these parents showed progress, becoming warmer and more effective during the course of the REDI-P intervention (Mathis & Bierman, 2015). However, they were not as effective as other parents at building child skills. These findings raise questions about whether this sub-group of parents would have been better served with a parenting program that focused more exclusively on positive management strategies prior to introducing home learning materials. At the other end of the spectrum, it is possible that some parents were well-prepared to take on the REDI-P home learning curriculum with their children and would have made similar progress with a less intensive intervention that involved fewer home visits. Additional research is needed to better understand the family characteristics that moderated response to REDI-P. A good sense of those moderators would provide an empirical basis for tailored approaches that might involve variations in the parenting strategies that were a focus of the intervention, or that might involve different levels of intervention intensity and delivery. Additional research is also needed to determine whether parent engagement interventions like REDI-P could be equally effective and more cost-effective if they used an adaptive or tailored design, in which the focus and timing of intervention support was determined by initial screening assessments or by family response during intervention.

Timing and administrative home. REDI-P was designed to cover the time period before and after children transitioned into kindergarten. We believed that timing the intervention over this critically important developmental transition point was a feature crucial to intervention impact. Certainly, parent interest and motivation to participate in the intervention seemed heightened at this major transition point for their child. However, covering this transition period

with intervention services is challenging due to the lack of alignment between early education programs and public school programs. Only the research funding and staffing available for REDI-P made it possible to track children and follow their families as they widely dispersed across the transition from Head Start to kindergarten. With the exception of the subset of public schools that house their own prekindergarten programs, it is very difficult for preschool programs to follow their students forward into elementary school, and conversely very difficult for elementary schools to “reach back” and identify and connect with parents of rising kindergarten students prior to school entry.

This disconnect between early childhood education programs and public schools raises questions about the best administrative home to sustain a program like REDI-P that covers the chasm between the two systems. Future research might determine whether REDI-P could work equally well if it did not extend across the prekindergarten and kindergarten years, and whether it could be more effectively implemented and sustained as a prekindergarten program or as a kindergarten program.

Coordinating and aligning home and school curricula. A related issue that requires additional research is the degree to which the impact of REDI-P or a program like it depends upon coordination with the preschool or kindergarten curriculum. REDI-P was designed to align with REDI-C. In the evaluation trial, all children in both the intervention and control groups received the enriched REDI-C program in Head Start. Although the effects of the classroom program were thereby controlled in the evaluation of REDI-P, it remains unclear whether the alignment with REDI-C played an important role in “priming” children for the home-based intervention materials. REDI-P was not coordinated in any specific way with the kindergarten

programming that children experienced. It remains unknown whether home-school curriculum alignment in kindergarten may have strengthened impact.

Ongoing implementation research. As research on REDI-P and other family engagement programs moves forward, additional research evaluating the mediation and moderation of short-term and long-term outcomes is a priority. Most efficacy trials are set up to determine whether a program is successful in producing targeted outcomes. Although this is important, mediation studies are also critical to help build a better understanding of how different intervention approaches achieve their goals. Studies such as those described in this chapter that explore the dynamics of parent engagement in intervention and that test the mediators identified in intervention logic models can contribute to a better understanding of the pathways by which preschool parent interventions produce downstream benefits and thereby inform the design and refinement of future interventions and guide future research. In addition, moderation studies are important to illuminate which parents and children benefit most from different intervention approaches. Parents seemed to engage more effectively in REDI-P when they had a warm relationship with their child and less effectively when their child had significant pre-existing attention deficits and behavior problems. Additional research is needed to determine whether an adaptive version of REDI-P or an alternative approach to family engagement support might improve benefits for this subgroup of families.

Summary

Parents provide critical on-going support for children's well-being and education. Family engagement programs that empower parents to promote their children's learning and development at the transition into formal schooling may be particularly strategic because of the potential for downstream benefits associated with improved trajectories of school success. For

these reasons, federal and state policies mandate parent engagement efforts, especially for children with vulnerabilities that may mitigate school achievement. However in response to these policy mandates, typical family engagement strategies remain limited to orientation sessions, parent-teacher conferences, and volunteer opportunities.

Research on REDI-P and the other programs presented in this volume highlight the potential power of more intensive and strategic family engagement programming to promote child success, reduce the fade-out of benefits associated with center-based preschool interventions, and reduce the school achievement gap associated with socioeconomic disadvantage. Children change teachers each year, but they remain with their parents, giving parents potential opportunities to support child development and school adjustment across the entire span of the child's education. Ongoing research holds promise for identifying the best ways to optimize preschool and kindergarten parent engagement programs, to the benefit of the children, families, and schools involved.

References

- Bailey, D., Duncan, G.J., Odgers, C.L., & Yu, W. (2017). Persistence and fadeout in the impacts of child and adolescent interventions. *Journal of Research on Educational Effectiveness*, *10*, 7-39.
- Baydar, N., Reid, M. J., & Webster-Stratton, C. (2003). The role of mental health factors and program engagement in the effectiveness of a preventative parenting program for Head Start mothers. *Child Development*, *74*, 1433–1453.
- Bierman, K.L., Domitrovich, C.E., Nix, R.L., Gest, S.D., Welsh, J.A., Greenberg, M.T., Blair, C., Nelson, K. & Gill, S. (2008). Promoting academic and social-emotional school readiness: The Head Start REDI program. *Child Development*, *79*, 1802-1817.
- Bierman, K.L., McDoniel, M. & Loughlin-Presnal, J.E. (in press). How a preschool parent intervention produced later benefits: A longitudinal mediation analysis. *Journal of Applied Developmental Psychology*.
- Bierman, K.L., Nix, R.L., Heinrichs, B.S., Domitrovich, C.E., Gest, S.D., Welsh, J.A., & Gill, S. (2014). Effects of Head Start REDI on children’s outcomes one year later in different kindergarten contexts. *Child Development*, *85*, 140-159.
- Bierman, K.L., Welsh, J.A., Heinrichs, B.S., & Nix, R.L. (2018). Preschool home visiting boosts school readiness and reduces need for services in elementary school: A randomized program evaluation. *JAMA Pediatrics*, *172*(8): e181029.
- Bierman, K.L., Welsh, J., Heinrichs, B.S., Nix, R.L., & Mathis, E.T. (2015). Helping Head Start parents promote their children’s kindergarten adjustment: The REDI parent program. *Child Development*, *86*, 1877-1891
- Blair, C. & Raver, C.C. (2015). School readiness and self-regulation: A developmental

- psychobiological approach. *Annual Review of Psychology*, 66, 711-731.
- Brotman, L.M., O'Neal, C.R., Huang, K., Gouley, K.K., Rosenfelt, A., & Shrout, P.E. (2009). An experimental test of parenting practices as mediator of early childhood physical aggression. *Journal of Child Psychology and Psychiatry*, 50, 235- 245.
- Collins, L.M., Murphy, S.A., Bierman, K.L., & the Conduct Problems Prevention Research Group (2004). A conceptual framework for adaptive preventive interventions. *Prevention Science*, 5, 185-196
- Committee on Integrating the Science of Early Childhood Development (2000). From neurons to neighborhoods: The science of early childhood development. Washington, D.C.: National Academy Press.
- Domitrovich, C. E., Cortes, R. & Greenberg, M.T. (2007). Improving young children's social and emotional competence: A randomized trial of the preschool PATHS curriculum. *Journal of Primary Prevention*, 28, 67-91.
- Dumas, J. E., Nissley-Tsiopinis, J., & Moreland, A. D. (2007). From intent to enrollment, attendance, and participation in preventive parenting groups. *Journal of Child and Family Studies*, 16, 1–26.
- Evans, M. A., & Shaw, D. (2008). Home grown for reading: Parental contributions to young children's emergent literacy and word recognition. *Canadian Psychology*, 49, 89-95.
- Ford, R.M., McDougall, S.J.P., & Evans, D. (2009). Parent-delivered compensatory education for children at risk of educational failure: Improving the academic and self-regulatory skills of a Sure Start preschool sample. *British Journal of Psychology*, 100, 773-797.
- Isaacs, J.B. (2012) Starting school at a disadvantage: The school readiness of poor children. Brookings Institution. Retrieved July 7, 2019 from <https://www.brookings.edu/wp->

[content/uploads/2016/06/0319_school_disadvantage_isaacs.pdf](#)

- Jones, D.E., Bierman, K.L., Crowley, D.M., Welsh, J.A., & Gest, J. (2019). Important issues in estimating costs of early childhood educational interventions: An example from the REDI program. Unpublished manuscript.
- Jordan, G. E., Snow, C. E., & Porche, M. V. (2000). Project EASE: The effect of a family literacy project on kindergarten students' early literacy skills. *Reading Research Quarterly, 35*, 524-546.
- Justice, L.M., & Ezzell, H.K. (2000). Enhancing children's print and word awareness through home-based parent intervention. *American Journal of Speech-Language Pathology, 9*, 257-269.
- Landry, S.H., Smith, K.E., Swank, P.R., & Guttentag, C. (2008). A responsive parenting intervention: The optimal timing across early childhood for impacting maternal behaviors and child outcomes. *Developmental Psychology, 44*, 1335-1353.
- Loughlin-Presnal, J.E., & Bierman, K.L. (2017). Promoting parent academic expectations predicts improved school outcomes for low-income children entering kindergarten. *Journal of School Psychology, 62*, 67-80.
- Lunkenheimer, E. S., Dishion, T. J., Shaw, D. S., Connell, A. M., Gardner, F., Wilson, M. N., & Skuban, E. M. (2008). Collateral benefits of the family check-up on early childhood school readiness: Indirect effects of parents' positive behavior support. *Developmental psychology, 44*, 1737.
- Manz, P.H., Hughes, C., Barnabas, E., Bracaliello, C., & Ginsburg-Block, M. (2010). A descriptive review and meta-analysis of family-based emergent literacy interventions: To what extent is the research applicable to low-income, ethnic-minority or linguistically-

- diverse young children? *Early Childhood Research Quarterly*, 25, 409–431.
- Mathis, E.T., & Bierman, K.L., (2015). Effects of parent and child pre-intervention characteristics on child skill acquisition during a school readiness intervention. *Early Childhood Research Quarterly*, 33, 87-97.
- Mol, S.E., Bus, A.G., de Jong, M.T., & Smeets, D.J.H. (2008). Added value of dialogic parent-child book readings: A meta-analysis. *Early Education and Development*, 19, 7-26.
- Nix, R. L., Bierman, K. L., Domitrovich, C. E., & Gill, S. (2013). Promoting preschool social-emotional skills with the Head Start REDI Program enhances academic and behavioral outcomes in kindergarten. *Early Education and Development*, 24, 1000-1019.
- Nix, R. L., Bierman, K. L., McMahon, R. J., & Conduct Problems Prevention Research Group (2009). How attendance and quality of participation affect treatment response to parent management training. *Journal of Consulting and Clinical Psychology*, 77, 429–438.
- Nix, R.L., Bierman, K.L., Motamedi, M., Heinrichs, B.S., & Gill, S. (2018). Parent engagement in an enriched Head Start home visiting program: Predictors and associations with child outcomes. *Early Childhood Research Quarterly*, 45, 106-114.
- Reardon, S.F. (2011). The widening socioeconomic status achievement gap: New evidence and possible explanations. In R.J. Murnane & G.J. Duncan (Eds), *Whither opportunity? Rising inequality, schools, and children's life chances*. New York: Russell Sage.
- Reese, E., Sparks, A., & Leyva, D. (2010). A review of parent interventions for preschool children's language and emergent literacy. *Journal of Early Childhood Literacy*, 10, 97-117.
- Reid, M.J., Webster-Stratton, C., & Baydar, N. (2004). Halting the development of conduct problems in Head Start children: The effects of parent training. *Journal of Clinical Child*

and Adolescent Psychology, 33, 279-291.

- Ryan, R.M., Fauth, R.C. & Brooks-Gunn, J. (2006). Childhood poverty: Implications for school readiness and early childhood education. In B. Spodek & O.N. Saracho (Eds.) *Handbook of research on the education of children* (2nd ed.) (pp.323-346.) Mahwah, NJ: Erlbaum Associates.
- Sandler, I., Schoenfelder, E., Wolchik, S., & MacKinnon, D. (2011). Long-term impact of prevention programs to promote effective parenting: Lasting effects but uncertain processes. *Annual Review of Psychology*, 62, 299-329.
- Senechal, M. (2006). Testing the home literacy model: parent involvement in kindergarten is differentially related to grade 4 reading comprehension, fluency, spelling, and reading for pleasure. *Scientific Studies on Reading*, 10, 59-87.
- Webster-Stratton, C., Reid, M. J., & Hammond, M. (2001). Preventing conduct problems, promoting social competence: A parent and teacher training partnership in Head Start. *Journal of Clinical Child Psychology*, 30, 283–302.
- Webster-Stratton, C. & Taylor, T.K. (2001). Nipping early risk factors in the bud: Preventing substance abuse, delinquency, and violence in adolescence through interventions targeted at young children (0-8 years). *Prevention Science*, 2, 165-192.
- Welsh, J.A., Bierman, K.L., Nix, R.L., Heinrichs, B., & Gest, S.D. (in press). Sustained effects of a school readiness intervention: Fifth grade outcomes of the Head Start REDI program. *Early Childhood Research Quarterly*.
- Yoshikawa, H., Weiland, C., Brooks-Gunn, J., Burchinal, M. R., Espinosa, L. M., Gormley, W. T., ... & Phillips, M. D. (2013). Investing in our future: The evidence base on preschool education (Vol. 9). *Ann Arbor, Michigan: Society for Research in Child Development*.

Figure 1.

REDI-P Logic Model

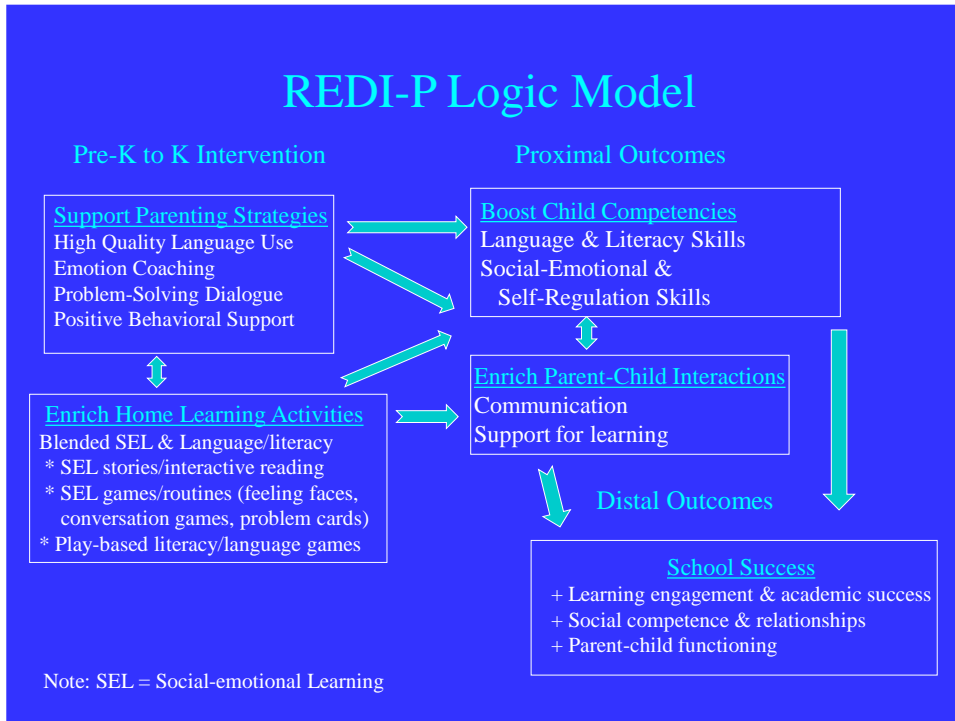
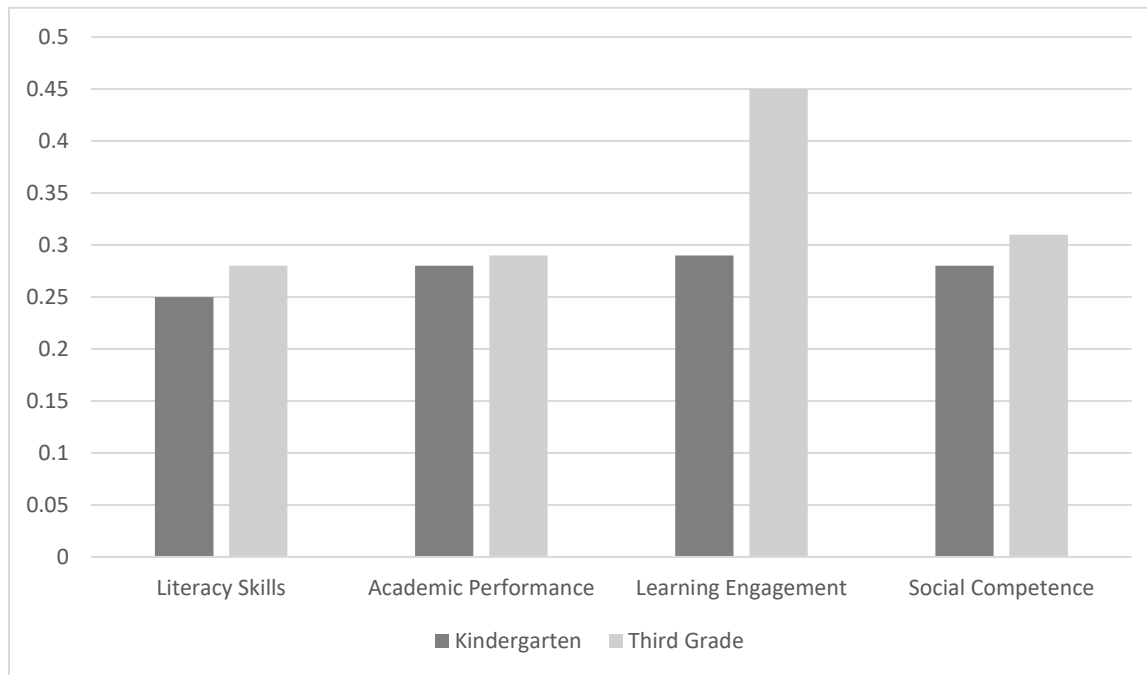


Figure 2.

REDI-P Effects on Child Outcomes in Kindergarten and Third Grade

Note: Effect sizes are in the small to moderate range and represent the average standard deviation difference between intervention and control groups. Different measures were used to in kindergarten and third grade to represent these outcome domains. Details are in Bierman et al., 2015 and Bierman et al., 2018.