Improving Preschool Education with Curriculum Enhancements and Professional Development:

The Head Start REDI Intervention Model

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Early education has become a primary strategy for improving the long term academic success of the nation’s children. This approach is based on research documenting that a high quality preschool experience improves children’s school readiness, and promotes benefits over time including higher scores on standardized achievement tests, lower levels of special education, and lower dropout rates (Burchinal, Peisner-Feinberg, Pianta, & Howes, 2002; Howes, Burchinal, Pianta, Bryant, Early, Clifford et al., 2008; NICHD Early Child Care Research Network [ECCRN], 2004). For high risk children such as those growing up in poverty, preschool is especially important for providing the cognitive stimulation and emotional support that may be lacking in the child’s social context but that are necessary for the development of school readiness skills (Bierman, Nix, & Makin-Byrd, 2008; Senechal & LeFevre, 2002). Although there are individual differences in children’s social-emotional, self regulation, and cognitive skills, all of these capacities are malleable through early educational experiences.

Not all preschool experiences are of equal value to children. The quality of the preschool experience is a critical factor determining its impact on child school readiness (Mashburn et al, 2008; NICHD ECCRN, 2004). Accumulating research suggests that two distinct aspects of quality are important: the content and focus of the preschool curriculum (e.g., what is being taught) and the quality of the teaching process which is reflected in the nature of teacher-child interactions (e.g., how the classroom is organized and managed and how learning activities are structured and supported). Enhancing preschool curriculum has proven effective in building child skills in both cognitive and social-emotional domains (Bierman, Domitrovich, & Darling, 2009; Lonigan, Burgess, & Anthony, 2000; Sarama & Clements, 2009). However, providing
enhanced curricula alone, without attending to the quality of teaching practices, may limit the impact on child outcomes (Wasik, Bond, & Hindman, 2006). Ideally, efforts to improve preschool quality include a dual emphasis on enriching the content of the curriculum to assure that key school readiness skills receive attention, and providing teachers with the professional development needed to promote high-quality and developmentally appropriate teaching practices and supportive student-teacher relationships.

In this chapter we present findings from the Head Start REDI (Research-based Developmentally Informed) project, an intervention that integrated the provision of curriculum-based enhancements targeting emergent literacy and social-emotional skills with multi-faceted and sustained professional development support to teachers. First, we describe the theoretical and empirical rationale for the REDI intervention design, along with the content and structure of program delivery and professional development support. Then, we review research evidence from the randomized-controlled trial, describing the impact of the REDI intervention on teaching quality and child school readiness outcomes. Overall, the findings we present suggest that the extensive emphasis on professional development included in the REDI program produced significant improvements in teaching quality, particularly among teachers who were open and responsive to the mentoring process. In a final set of analyses conducted for the purpose of this chapter, we explore how the observed quality of teaching in the classroom and the enriched curriculum both contributed to growth in children’s school readiness skills. We conclude that, in the quest to improve preschool quality and child school readiness, it is valuable to include a focus on teacher professional development and general teaching skills in the context of delivering a specific enriched curriculum. We then discuss the implications of the findings for
future research on the professional development of early childhood teachers and models of early childhood intervention.

**Building Blocks of School Readiness: The Value of Enhancing Preschool Curriculum**

Models of early childhood education encourage teachers to provide rich preschool environments that allow children to learn through active exploration and responsive discussion with sensitive adults (Bredekamp & Copple, 1997; National Association for the Education of Young Children, 2010; Rooparine & Johnson, 2009). This places considerable burden on teachers to identify activities that are highly interactive, engaging, and sequenced to enhance child skill acquisition. Evidence-based preschool curricula facilitate effective preschool education by supplying teachers with learning objectives and instructional activities that are validated in developmental research and by helping them select and organize learning activities in a systematic and strategic way so that children are exposed sequentially to the developmental skills associated with school readiness. Prior research supports the use of curricula to guide instruction in both emergent literacy and social-emotional domains (Bierman & Erath, 2006; Justice & Pullen, 2003).

**Preschool Curricula that Promote Emergent Literacy Skills.**

In the domain of emergent literacy skills, evidence-based curricula focus both on activities that build specific emergent literacy skills and those that strengthen language skills more generally, based upon developmental research documenting the importance of both types of skills for later reading (Dickinson & Neumann, 2006). Specifically, longitudinal research has established that one of the strongest predictors of early elementary reading success is the preschool acquisition of component skills that help children decode printed text, including phonological awareness (e.g., the ability to recognize and manipulate the smaller units of sound
within spoken words, such as syllables and phonemes), letter-recognition, and knowledge of letter-sound correspondence (Scarborough, 2001). Even when intellectual ability and vocabulary skills are controlled, letter knowledge and phonological awareness predict enhanced levels of reading proficiency in first and second grade (Snow, Burns, & Griffin, 1998). In addition, as children move through the elementary grades, oral language skills play an increasingly important role in reading comprehension. Both vocabulary and the ability to understand and produce grammatically varied utterances and narratives are necessary for children to be able to extract meaning from printed text and to understand and follow teachers’ oral instructions (Dickinson, McCabe, Anastasopoulos, Peisner-Feinberg, & Poe, 2003). Economically disadvantaged children are less likely than peers living in higher socioeconomic-status families to have reading materials available in the home, to experience interactive reading with parents and other adults, or to engage in complex conversations (Senechal & LeFevre, 2002). As a result, their exposure to the kind of rich, decontextualized talk that expands vocabulary and promotes narrative skill is often limited.

Research has demonstrated that it is possible to reduce the school readiness gap by providing teachers with systematic curricula and learning materials that promote these specific language and emergent literacy skills. These types of interventions are typically universal models that are delivered in the classroom. Learning games that explicitly target children’s listening skills improve children’s phonological awareness and thereby enhance reading ability (Adams, Foorman, Lundberg, & Beeler, 1998). Studies also have tested the impact of providing children with instruction in alphabetic principles, alone and in combination with intervention to promote phonological awareness, and found that both curriculum components have added value in producing gains in reading achievement (Assel, Landry, Swank, & Gunnewig, 2007; Ball &
Blachman, 1991; Lonigan et al., 2000). When book-reading is more interactive and includes scripted questions within the text and the presentation of props to foster word knowledge, it promotes richer conversational exchanges in the classroom and gains in child vocabulary and oral comprehension skills (Wasik & Bond, 2001; Wasik et al., 2006; Whitehurst, Arnold et al., 1994; Whitehurst, Epstein, Angell, Payne, Crone, & Fischel, 1994). These studies validate the approach of enhancing preschool programs with evidence-based curricula to promote emergent literacy skills; they provide teachers with developmentally-sequenced learning activities, which assure that children are exposed systematically to the emergent literacy skills needed to support their readiness to read at school entry.

**Preschool Curricula that Promote Social-Emotional Skills**

Language and emergent literacy skills are essential for school readiness, but when asked what children need to be successful in kindergarten, most teachers place equal emphasis on behavioral and social-emotional aspects of school readiness, such as the ability to pay attention, follow directions, and get along with others (Rimm-Kaufman, Pianta, & Cox, 2000). Evidence-based preschool curricula have also proven effective in promoting these social-emotional skills.

Self management is one skill domain that is essential for both academic and social success. Children who are able to maintain attention to tasks, manage their behavior, and work cooperatively with other children exhibit higher levels of achievement in school than children with delays or deficits in these skills (Hughes & Kwok, 2006; McClelland, Acock, & Morrison, 2006). In addition, emotion knowledge, perspective-taking, and social problem-solving skills enable children to manage the demands of the kindergarten classroom. Studies show concurrent associations among these social-emotional skills and cognitive abilities in early childhood (Garner & Waajid, 2008; Miller, Gouley, Seifer, Dickstein, & Shields, 2004), and longitudinal
research suggests that social-emotional and self-regulation skills are uniquely related to children’s academic achievement, primarily through their influence on classroom participation and social engagement (Ladd, Birch, & Buhs, 1999).

Several evidence-based curricula have been developed to promote social-emotional skills in young children. Similar to the interventions in the language and literacy domain, the majority of these are universal approaches delivered by teachers through explicit lessons and activities (Bierman et al., 2009; Joseph & Strain, 2003). In most cases, these curricula attempt to build skills in several key domains simultaneously, including prosocial behaviors (e.g., helping, sharing; taking turns), emotional understanding (e.g., recognizing and labeling the feelings of oneself and others), and self-control and social problem-solving skills for effective conflict management (Domitrovich, Cortes, & Greenberg, 2007; Lynch, Geller, & Schmidt, 2004; Webster-Stratton, Reid & Hammond, 2004). In some cases, the emphasis is on one particular skill domain, such as social problem-solving skills (Shure & Spivack, 1982) or emotional understanding (Izard, Trentacosta, King, & Mostow, 2004; Izard, King, Trentacosta, Morgan, Laurenceau, Krauthamer-Ewing, & Finlon, 2008). Research on the efficacy of these interventions confirms that systematic curricula and learning activities can be implemented by early childhood educators and promote significant growth in social-emotional competencies (Domitrovich et al., 2007; Izard et al., 2004; Izard et al., 2008; Lynch et al., 2004; Webster-Stratton et al., 2004).

**Teaching Quality and Its Relation to Child School Readiness**

Observational studies of preschool classrooms indicate that the quality of teacher-student interactions influence learning (Curby, LoCasale-Crouch, Konold, Pianta, Howes, Burchinal et al., 2009; Mashburn et al., 2008). Research on teaching quality suggests that there are specific
types of interactions between students and teachers in preschool settings that foster school readiness (NICHD Early Child Care Research Network [ECCRN], 2000) and contribute to higher levels of achievement in early elementary school (Howes et al., 2008; NICHD ECCRN, 2004; Peisner-Feinberg, Burchinal, Clifford, Culkin, Howes, Kagan, et al., 2001). Two particularly important areas of teaching quality involve (1) teachers’ use of language in the classroom and the way they organize learning activities, and (2) teachers’ positive behavior management strategies and sensitivity to children’s emotional needs.

Language Use and Instructional Support

The linguistic development of young children is fostered in the context of conversational exchanges with others. Research shows that adults play an active role in shaping this process by expanding and recasting what children say and by using richer and more nuanced vocabulary, different verb tenses, and grammatically-varied sentence structures (Nelson & Welsh, 1998). This type of language scaffolding has been studied primarily in the context of book reading (Dickinson, 2001), but can take place anywhere in the classroom and have an impact on student skill growth (Gest, Holland-Coviello, Welsh, Eicher-Catt, & Gill, 2006). When teachers provide a language-rich classroom environment, children benefit in areas of language development and reading readiness (Beals, DeTemple, & Dickinson, 1994; Dickinson & Tabors, 2001; NICHD ECCRN, 2000).

Conversations and instructional exchanges between adults and children in preschool take place in the context of relationships that have the potential to facilitate or undermine the value of the exchange for child learning. Student-teacher relationships develop over time through repeated exchanges and are typically conceptualized in terms of the degree to which they are positive and supportive or characterized by conflict (Mashburn & Pianta, 2006). A positive
student-teacher relationship has been shown to facilitate language learning (Dickinson & Smith, 1994) and to contribute independently to children’s academic adjustment in elementary school and middle school (Burchinal et al., 2002). Furthermore, interventions that enhance the quality of language exchanges between teachers and young children significantly improve the number of children’s utterances and multiword combinations (Girolametto, Weitzman, & Greenberg, 2003).

Research suggests that providing explicit curriculum components alone is typically not sufficient to promote improvements in teaching quality, unless there are concurrent changes in the nature of the interactions between teachers and students in the classroom setting (Justice, Mashburn, Hamre, & Pianta, 2008). For this reason, in recent years researchers have begun to combine evidence-based curriculum enrichments with extended professional development activities for teachers, in order to strengthen the generalized impact of the curriculum on child skill acquisition.

Recognizing the importance of teacher language use for children’s emergent literacy skill development, Wasik et al. (2006) developed an evidence-based curriculum in interactive reading (with sequenced and scripted books, lessons, and materials), and enriched it with additional professional development for teachers. The extra training that teachers received focused on general strategies of language use in the classroom, designed to improve the quality of teacher-student language exchanges in the classrooms. The professional development model involved a repeating sequence of short training sessions on specific strategies, modeling by the program developer, observation of the teacher using the new strategies in the classroom, and oral and written feedback. Teachers received an average of two hours of coaching per month. The study was not designed to disentangle the individual contributions of each of the intervention components, but rather to enrich the impact of the overall curriculum by providing teachers with
the professional development they needed to teach the curriculum effectively and generalize the language strategies that were part of the curriculum throughout the day. The intervention had positive effects on both teacher and student outcomes (Wasik et al., 2006). Observations confirmed that the intervention teachers engaged in more conversation that was of high quality (i.e., open ended questions) during book reading and throughout the day. Direct assessments of children’s language skills also indicated that the program was a success. Children whose teachers received the intervention displayed better vocabulary on the Expressive One-Word Picture Vocabulary Test and greater receptive language on the Peabody Picture Vocabulary Test–III (Wasik et al., 2006).

**Positive Classroom Management and Emotional Support**

High quality teaching in early childhood promotes student social competence in addition to language and cognitive skills, and research has linked several specific teaching practices with the acquisition of social-emotional skills (Mashburn & Pianta, 2006). For example, positive discipline – which relies on classroom rules, specific praise to reinforce desired behaviors, minimal use of controlling directions, and the avoidance of punitive strategies, such as threats or rebukes – is associated with improvements in both language development and adaptive student behavior (Arnold, McWilliams, & Arnold, 1998; Whitebook, Howes, & Phillips, 1990). Child self-regulation skills are fostered when teachers provide clear expectations and predictable and appropriate routines, rather than relying on directives and negative consequences (Raver, Jones, Li-Grining, Zhai, Bub, & Pressler, in press). Similarly, the use of induction strategies, in which teachers provide reminders, cues, and feedback to help children monitor their own behavior and self-correct, is thought to encourage student self-control efforts (Berkowitz & Grych, 1998; Bierman, 2004).
In addition, teachers who develop warm and positive relationships with their students foster a sense of security that encourages exploration and active engagement in learning (Howes & Smith, 1995; Kontos & Wilcox-Herzog, 1997; NICHD ECCRN, 1998). Teachers who also create emotionally supportive classroom environments create a context for social-emotional learning. Specifically, those teachers who validate children’s emotions and respond with empathy when children are upset facilitate a similar prosocial and empathic orientation in them that carries over into peer interactions, thus fostering social competence (Gottman, Katz, & Hooven, 1997). When conflicts arise between students, teachers who use social problem-solving dialogue can enhance children’s skills for non-aggressive conflict management by helping them identify the problem, generate and select a solution that is acceptable to everyone, and implement their plan (Denham & Burton, 2003; Shure & Spivack, 1982).

Two intervention studies document the value of providing preschool teachers with professional development support focused on promoting their positive classroom management skills. In a study designed to promote social-emotional competence and prevent conduct problems in young children (preschool through first grade), Webster-Stratton, Reid, & Stoolmiller (2008) tested the efficacy of the Incredible Years teacher management and child social-emotional curriculum (Dinosaur School) as a universal prevention program. This comprehensive program includes teacher training focused on promoting positive classroom management skills and a social-emotional curriculum that provides lessons in prosocial behavior, emotional understanding, and self-control. The professional development training in this trial included 4 days of in-service training, delivered during monthly workshops. In addition, a trained program staff visited the classroom regularly and co-led all Dinosaur School lessons with the teacher. Similar to other early childhood interventions that involve the combination of
curricular components and professional development, the trial was not designed to examine to effects of the individual components but the power of the combination. Compared to teachers in the “usual practice” control classrooms, teachers in the intervention were rated as warmer, more affectionate, more consistent, and less punitive in their interactions with students (Webster-Stratton et al., 2008). Moreover, children whose teachers delivered the curriculum and participated in the training workshops displayed more social competence and emotion regulation and less aggression, with the effects greatest for children who exhibited elevated behavior problems at the start of the year.

A second, independent randomized-controlled trial of an adapted version of the Incredible Years program validated the power of this intervention to improve teaching practices. In the Chicago School Readiness program, teachers received 30 hours of workshop training focused on supporting children’s emotional and behavioral regulation through non-punitive classroom management strategies. Teachers were also taught stress management strategies to counteract the negative effects of work-related stress in themselves. In-class mental health specialists supported teachers with individual “coaching.” In addition, these mental health specialists developed targeted behavior management plans for children with the highest levels of emotional and behavioral problems. As a result of the intervention, teaching practices improved (Raver, Jones, Li-Grining, Metzger, Champion, & Sardin, 2008), and there was a reduction in children’s internalizing and externalizing symptoms, assessed by teacher ratings and direct observations (Raver, Jones, Li-Grining, Zhai, Metzger, & Solomon, 2009). Recent analyses suggest that children in the Chicago School Readiness Program also made gains in attention/impulse control and executive functioning, which accounted for further gains in vocabulary, letter naming, and early math skills (Raver et al., in press).
Summary

Overall, this accumulating research evidence suggests that two, complementary approaches may produce optimal enhancements in preschool education quality and thereby help to close the gap in school readiness associated with early disadvantage. First, the content and focus of the preschool curriculum (e.g., what is being taught) needs to be enriched to ensure that it includes evidence-based approaches to promoting the emergent literacy, numeracy, and social-emotional skills that are core to school readiness. Second, the quality of the teaching practices and the nature of teacher-child interactions (e.g., how the classroom is organized and managed and how learning activities are structured and supported) need to be enhanced. In particular, teachers need to rely on evidence-based best practices to guide the way they interact with their students, especially in areas of language use, instructional support, behavior management, and emotion coaching (Domitrovich, Moore, & Greenberg, in press).

The Head Start REDI Program

In the next section, we describe the Head Start REDI program, which integrated curriculum-based enhancements targeting emergent literacy and social-emotional skills with the provision of multi-faceted and sustained professional development support focused on improving teaching quality. The broad goal of this dual emphasis was to improve Head Start program impact on child school readiness. The theory underlying the REDI program is that improvements in children’s language and literacy skills and social-emotional functioning would benefit from enrichment in areas of both the curriculum and the quality of teaching practices.

The REDI intervention targeted the promotion of specific school readiness competencies in the domain of cognitive development (i.e., language and emergent literacy skills) and the domain of social-emotional development (i.e., prosocial behavior, emotional understanding, self-
regulation, and aggression control). The intervention was designed for delivery by classroom teachers and integrated into their ongoing classroom programs. It included curriculum-based lessons that followed a developmental sequence, center-based extension activities, and training in specific interaction strategies to be used by teachers throughout the day.

**Language and emergent literacy skills enrichment**

Four language and emergent literacy skills were targeted in REDI: (1) vocabulary, (2) syntax, (3) phonological awareness, and (4) print awareness. Three program components targeted these skills, including a set of sound games, alphabet center activities, and an interactive reading program. The sound games were designed to promote phonological awareness by focusing on listening skills, rhyming, alliteration, words and sentences, and syllables and phonemes (Adams et al., 1998). The games were organized developmentally, so that difficulty increased over the course of the year. Teachers were asked to use a 10-15 minute sound game activity at least three times per week.

To promote print knowledge, teachers were provided with a developmentally-sequenced set of activities and materials to be used in their alphabet centers, including letter stickers, a letter bucket, materials to create a “Letter Wall,” and craft materials for various letter-learning activities. Teachers were asked to make sure that each child visited the alphabet center several times per week, and they were given materials to track the children’s acquisition of letter names.

The interactive reading curriculum was based on the program developed by Wasik and Bond (Wasik & Bond, 2001; Wasik et al., 2006) which was adapted from the program developed by Whitehurst and colleagues (Whitehurst, Arnold, Epstein, & Angell, 1994). The REDI curriculum included two books per week, which were scripted with questions to help teachers encourage children’s active engagement and lively discussion. Each book had
a list of targeted vocabulary words that were presented with the aid of physical props and illustrations. Moreover, books were selected so that content coincided and reinforced lessons of the social-emotional skills curriculum.

In the REDI trial, teachers presented curriculum materials in a systematic way during the week, and also received mentoring in the use of “language coaching” strategies (such as expansions and grammatical recasts) to provide a general scaffold for language development in the classroom (Dickinson & Smith, 1994). The overall goal was to improve teachers’ strategic use of language in ways that would increase children’s oral language skills, including vocabulary, narrative, and syntax.

**Social-Emotional Skills Enrichment.**

The preschool PATHS curriculum (Domitrovich, Greenberg, Kusche, & Cortes, 2005) was used in REDI to promote children’s social-emotional skills. This curriculum targeted four domains: (1) prosocial friendship skills, (2) emotional understanding and expression skills, (3) self-control, such as the capacity to inhibit impulsive behavior and organize goal-directed activity, and (4) problem-solving skills focused on interpersonal negotiation and conflict resolution. The curriculum was divided into 33 lessons that are delivered by teachers during circle time. These lessons included modeling stories and discussions and utilized puppet characters, photographs, and teacher role-play demonstrations. Each lesson included extension activities, such as cooperative projects and games that provided children with opportunities to practice the target skills with teacher support at a later time. In REDI, teachers were asked to conduct one PATHS lesson and one extension activity each week.

Teachers were encouraged to help their children generalize the content of the PATHS lessons throughout the week. As previously stated, the books selected for interactive reading
touched on the same topic as the PATHS lesson of the week and afforded an additional opportunity to discuss core concepts in a different context. In addition, teachers were encouraged to use positive classroom management and specific praise to model appropriate, respectful ways of interacting with others. They were also encouraged to use emotion coaching and induction strategies to promote appropriate self-control.

**Professional Development**

The REDI professional development model included both formal workshops and coaching, which consisted of weekly classroom visits, modeling, technical assistance, and consultation. The training and support were designed not only to help teachers learn the mechanics of conducting the curriculum lessons in the context of Head Start, but also to help the teachers understand the theory and rationale for the enhancements.

Formal training workshops were delivered in a large group format, with small-group breakout sessions used to facilitate discussion and reflection. Trainers utilized a variety of methods including didactic instruction, practice exercises, and videotape review and discussion. An initial three-day workshop took place in the summer prior to the beginning of the school year. This workshop included approximately one-half day of general orientation, one day of language and literacy skill training, one day of social-emotional skill training, and one-half day of program-specific meetings about the logistics of implementing REDI. A second training workshop was held mid-year in January, and focused on more advanced teaching processes, such as the use of inductive strategies to promote self-regulation and the use of social problem-solving dialogue in the classroom. Both lead and assistant teachers attended these workshops and were encouraged to share responsibility for implementation.
Lead and assistant teachers also received weekly support provided by REDI trainers, local master teachers with several years of experience who were supervised by project-based educational consultants. The REDI trainers spent an average of three hours per week in each classroom observing, modeling intervention techniques, and team-teaching lessons.

In addition, REDI trainers spent an hour per week meeting with both the lead and assistant teachers to review progress. In these meetings, teachers first presented their weekly implementation form, describing what they had done, reflecting on the effectiveness of the various activities and lessons, and noting any teaching questions or challenges. This served as a platform for the REDI trainers to comment on specific positive teaching practices they had observed that week and to provide suggestions for improvements or solutions for challenges that were encountered.

In the second half of each meeting, REDI trainers reviewed specific teaching strategies that were a formal part of the intervention. These process strategies were organized hierarchically and introduced sequentially, according to frequency of use and the skill level required for implementation. During the first half of the year, REDI trainers focused on teaching strategies that were designed to promote a positive classroom environment, including the use of positive management strategies, such as specific praise and organizing transition routines, acknowledging and validating children’s feelings, and preventing behavior problems. Trainers also introduced and emphasized language coaching strategies, especially the use of questions, expansions, and decontextualized talk, as well as the generalized use of target vocabulary. During the second half of the year, trainers emphasized strategies that could be used to respond to and re-focus problem behaviors in positive ways, particularly the use of induction strategies and social problem-solving dialogue. The goal was to maximize the use of teaching strategies
that supported child language and social-emotional skill development and minimize the use of strategies based on external controls, such as negative consequences and time outs.

In presenting the various teaching strategies, REDI trainers used examples and videotaped models to introduce skill concepts, encouraged discussion about applying the specific strategy in the teachers’ particular classrooms, and suggested practice activities. Teachers were encouraged to identify personal goals regarding their use of the focal teaching strategies in the coming week. Although REDI trainers presented the same sequence of strategies to all teachers, the pace was adjusted to accommodate individual teachers’ mastery of the material.

**Overview of the REDI Intervention Trial**

In the following sections, we review research evidence from the randomized-controlled trial of REDI focused on the intervention impact on teaching quality and child outcomes. In new analyses conducted for this chapter, we also examine how different patterns of enriched curriculum and high-quality teaching were associated with growth in child outcomes.

**Design of the Evaluation Trial.**

Forty-four Head Start classrooms, including 88 head and assistant teachers and 356 four year-old children, participated in the randomized-controlled trial used to evaluate REDI. Approximately one-half of the participating classrooms were located in a larger, moderately densely populated urban county of Pennsylvania, and the other half were located in two smaller, rural counties of Pennsylvania. Head Start centers were stratified on county location, length of program day, the proportion of Spanish-speaking children, and center size to assure even representation in the intervention and comparison conditions. Within each stratified group, centers were randomly assigned to intervention or the “as usual” comparison conditions. Teachers were studied as they implemented the REDI intervention for the first time.
To evaluate intervention effects, baseline and post-intervention assessments were completed on all teachers and their students. Teacher assessments occurred at the end of the academic year prior to their implementation of REDI and at the end of the REDI implementation year and included self-reports and observations of teaching practices by the research team. Child assessments occurred at the beginning and end of the Head Start year and included direct testing of language, literacy, and social-emotional skills, observations of peer interactions, and teacher and parent ratings of behavior (for details, see Bierman, Domitrovich et al., 2008; and Domitrovich, Gest, Gill, Bierman, Welsh & Jones, 2009).

**Intervention Implementation**

An important initial question was the degree to which teachers were able to effectively implement curriculum enrichments in both the language-literacy and social-emotional domains simultaneously. Although it was a scheduling challenge at first, particularly for teachers in half-day programs, most teachers were able to deliver the majority of the curriculum. Based upon teacher report, they conducted an average of 1.77 PATHS lessons and extension activities, 6.08 dialogic reading lessons, 2.57 sound games, and 3.56 alphabet center activities.

Several measures were collected to track the quality of the curriculum implementation. Each week, teachers rated the quality of their implementation of program components using 3-point scales (e.g., “Were you able to complete the lesson as written? How well did the children understand the major points of the lesson?”) In addition, at the end of each month, REDI trainers rated the quality of the teachers’ curriculum implementation, based on their observations in the classroom. The average teacher rating (across the year) was 2.78 (on a 3-point scale), reflecting the teachers’ confidence in their implementation quality and their perceptions of positive child engagement. Similarly, across components, REDI trainers gave teachers average ratings of
approximately “3” on the 4-point rating scale, reflecting good fidelity in the delivery of the curriculum components. REDI trainer ratings averaged between 3.0- 3.5 on the 4-point scale for child engagement in the lessons, reflecting the ease with which teachers were able to engage students in the curriculum lessons. Hierarchical linear models were also applied to the REDI trainer ratings to examine growth patterns over the course of the school year. Trainer ratings of implementation quality increased significantly over the course of the year for interactive reading (teacher delivery and child engagement) and Alphabet center (child engagement) (see Domitrovich, Gest, Gill, Jones, & Sanford DeRousie, 2009 for more details). These findings suggest that the workshop and curriculum materials provided teachers with considerable support to implement the REDI program with fidelity from the very beginning; moreover, the ongoing support of REDI trainers helped teachers maintain those initial levels and improve their own skills and child engagement in some areas.

In addition to delivering curriculum components with fidelity, a key goal of the REDI program was to increase the quality of teaching practices. To assess the course of improvements in teaching quality, REDI trainers completed monthly ratings on teachers’ generalized use of the teaching practices that were a focus of the intervention. Using a 5-point scale with multiple items for each domain, trainers rated language richness (e.g., recasts of children’s statements to support grammatical understanding, decontextualized talk), social-emotional support (e.g., encourages the identification and labeling of feelings), behavior management (e.g., uses induction strategies to promote autonomy), and sensitivity-responsiveness (e.g., is available and warm). Hierarchical linear models were used to examine growth over time in teachers’ use of these REDI teaching practices. Significant linear growth was documented in each of the four targeted teaching practices (see Domitrovich, Gest, Gill, Jones et al., 2009 for more detail).
Average ratings of language richness increased from 2.78 in September to 3.49 in April, indicating that teachers showed a steady increase in the quality of their language use in the classroom (on the 5-point rating scale, 3 = sometimes). Average ratings of social-emotional support increased from 2.80 to 3.63 over the course of the year. Average ratings of behavior management increased from 3.02 to 3.71, and average ratings of sensitivity-responsiveness increased from 3.42 to 3.93. These findings suggest that the ongoing support from the REDI trainer was particularly important and useful in promoting changes in the use of the broader teaching practices advocated by the program. Put another way, teachers showed fairly high-quality and consistent implementation of the scripted lessons in the REDI curriculum from the very beginning of the year. The mastery of the high-quality teaching practices (which were not scripted and required more teacher skill and creativity) took longer, but teachers were able to use the ongoing support and mentorship of the REDI trainers to continually improve in the quality of these teaching practices over the course of the year.

In the Domitrovich, Gest, Gill, Jones et al. (2009) study, we also explored the degree to which certain characteristics of teachers or their job situations might affect their implementation of the REDI curriculum and teaching practices. We examined several sets of pre-intervention factors, including teachers’ professional development (i.e., formal education, amount of on-the-job training, and years of teaching experience), teachers’ stress level and overall emotional well-being (i.e., depression, feelings of efficacy regarding their teaching, and degree of emotional exhaustion experienced on the job), teachers’ perceptions of their work environment (i.e., satisfaction, climate, values, and support), teachers’ ratings of the acceptability of the intervention, and REDI trainers’ perceptions of their working alliance with teachers. We found that education level uniquely predicted language richness and social-emotional support. We also
found that teachers who reported being more emotionally exhausted at the end of the academic year prior to intervention were rated by REDI trainers as engaging in richer patterns of language interactions and more effective behavior management practices over the year. This likely reflects the fact that rich language use and effective behavior management are effortful, and good teachers are more tired by the end of the year than teachers who show lower levels of high-quality interactions with their students. Teachers’ ratings of the acceptability of the intervention were related to improvements in social-emotional support. By far, however, REDI trainers’ ratings of teachers’ openness to consultation was the best predictor of implementation of the focal teaching practices, being related to growth in language richness, social-emotional support, behavior management, and sensitivity-responsiveness. These findings highlight important relations between the professional development process and growth in the use of high-quality, effective teaching practices.

**REDI Intervention Outcomes**

**Teaching Outcomes**

The ratings provided by teachers and REDI trainers during the course of the year suggested a positive intervention impact on teaching quality. However, both teachers and trainers were involved in the intervention itself, which could produce biased viewpoints. Therefore, to provide an unbiased evaluation of the impact of intervention on teaching quality, end-of-year observations of teachers were conducted by research assistants. These assistants conducted observations in intervention and “usual practice” classrooms, and were blind to study condition. In their direct observations, they utilized three rating scales: the Teaching Style Rating Scale (TSRS; Domitrovich, Cortes, & Greenberg, 2000), the Classroom Assessment Scoring System (CLASS; La Paro & Pianta, 2003), and the Classroom Language and Literacy
Environment Observation (CLEO; Holland-Coviello, 2005). The TSRS assessed positive discipline (e.g., use of specific praise and redirection), classroom management (e.g., preparedness and use of consistent routines), and positive emotional climate (e.g., scaffolding to help students regulate emotions). The CLASS assessed emotional support (e.g., positive climate) and instructional support (e.g., concept development and quality of feedback). The CLEO included time samplings of language use (e.g., number of statements made, number of questions asked, and instances of decontextualized talk) and ratings of language richness-sensitivity (e.g., elaboration of children’s utterances).

Compared to teachers in the Head Start “as usual” condition, teachers in Head Start REDI received significantly or marginally significantly higher scores on the TRSR positive emotional climate and classroom management scales, the CLASS instructional support scale, the CLEO counts of positive language use, and the CLEO ratings of language richness-sensitivity. A summary of these analyses is presented in Table 1 (see Domitrovich, Gest, Gill, Bierman et al., 2009, for details about the analyses and for results regarding specific subscales). These intervention effect sizes were moderate to large, ranging from .39 to .89, and representing differences between teachers in the two conditions of more than one-third standard deviation to almost one full standard deviation.

These findings indicate that the REDI intervention successfully improved teaching quality. Compared to the control group, REDI teachers established a more positive classroom climate, used more preventive behavior management strategies, and talked with children more frequently and in more cognitively complex ways. Additional analyses revealed this effect was not moderated by teacher status, suggesting that both lead and assistant teachers made similar significant changes in their behavior as a result of participating in REDI. Although unique
contributions cannot be disentangled, the changes in multiple aspects of teaching quality were likely the result of providing enhanced curriculum materials in the language-literacy and social-emotional domains that facilitated the kinds of teacher-student interactions we wanted to see, and they were likely the result of intensive professional development and ongoing mentorship provided throughout the intervention year.

**Child Outcomes**

In addition to showing positive effects on teaching quality, the Head Start REDI program successfully accelerated children’s growth in the targeted domains of language and emergent literacy skills and social-emotional competence. Children’s vocabulary and language skills were assessed with the Expressive One-Word Picture Vocabulary Test (Brownell, 2000). Emergent literacy skills were assessed with a composite of the Blending, Elision, and Print Awareness scales of the Test of Preschool Early Literacy (Lonigan, Wagner, Torgesen, & Rashotte, 2007). Children’s emotional knowledge was assessed with the Emotion Recognition Questionnaire (Ribordy, Camras, Stafani, & Spacarelli, 1988). Their social problem-solving skills were assessed by counting the number of competent responses they freely generated on the Challenging Situations Task (Denham, Bouril, & Belouad, 1994). Children’s behavior was also directly observed. In a procedure developed for this study, we assigned children to small time-limited play groups of classmates and collected ratings of their social competence (e.g., prosocial behavior and emotion regulation skill) and aggression as they negotiated the collective use of novel toys.

Hierarchical linear models, accounting for the nesting of children within classrooms, indicated that children in Head Start REDI exhibited significantly more growth during the pre-kindergarten year in vocabulary, emergent literacy, emotion recognition, and social problem-
solving skills, compared to children in control group classrooms. Marginally significant findings suggested that they also displayed more social competence in the classroom at the end of the year. A summary of some of the results from these analyses is presented in Table 2 (Bierman, Domitrovich et al., 2008, for details of these analyses and results for other outcomes). These adjusted intervention effect sizes were small to moderate, ranging from .15 to .45, and represented differences in growth between children in the intervention and control group classrooms of about one-sixth to almost one-half of a standard deviation.

**The Importance of Both High-Quality Teaching and an Enriched Curriculum**

An assumption of the REDI intervention design was that a dual focus on enriched curriculum and promoting high-quality teaching practices would maximize positive effects for children. One way to examine those relations was to examine the different patterns of enriched curriculum and high-quality teaching that existed in our sample. Thus, in additional analyses we categorized classrooms according to whether they were in the intervention or control condition – and hence included the enriched or standard Head Start curriculum – and whether teachers demonstrated above- or below-average levels of teaching quality. We hypothesized that children in those classrooms with the enriched curriculum and high-quality teaching would show the most improvement over the course of the pre-kindergarten year. We hypothesized that children in the classrooms with neither the enriched curriculum nor high-quality teaching would show the least improvement. Most important, these analyses could reveal when the enriched curriculum, even in the absence of high-quality teaching, had a positive effect, and when high-quality teaching, in the absence of an enriched curriculum, had a positive effect.

To create an overall indicator of teaching quality, we standardized the end-of-year TSRS total score, the CLASS total score, the CLEO time-sampling of language use, and the CLEO
ratings of language richness-sensitivity. We then took an average of these four standardized scores (α = .80) and divided classrooms according to whether they were above or below average on that global indicator of teaching quality. Overall, there were 17 classrooms in the intervention condition with above-average teaching quality by the end of the year, 5 classrooms in the intervention condition with below-average teaching quality, 10 classrooms in the control condition with above-average teaching quality, and 12 classrooms in the control condition with below-average teaching quality.

We created dichotomous indicators denoting which classrooms fell into each of the four categories. To examine how the combination of enriched curriculum and teaching quality affected children’s outcomes, we re-ran the hierarchical linear models we initially used to assess the efficacy of the REDI intervention on children’s growth in language-literacy and social-emotional skills. However, in these models we substituted three dichotomous indicators representing the combination of enriched curriculum and teaching quality for the single indicator of intervention condition. Using control condition classrooms with below-average teaching quality as the default category, these three dichotomous indicators revealed relative change for children in the other kinds of classrooms. Because all continuous variables were standardized, the parameter estimate for each dichotomous indicator is similar to an adjusted effect size. The results of these analyses are presented in Table 3.

The value in the first column of the first row reveals that children in the classrooms that included the enriched curriculum and high-quality teaching tended to score .13 of a standard deviation higher in vocabulary at the end of the Head Start year, compared to children in classrooms without the enriched curriculum and with lower-quality teaching (p < .10). Students in these classrooms also had significantly higher levels of vocabulary at the end of the year.
compared to students in the control group classrooms with above-average teaching quality, highlighting the importance of the interaction between the enriched curricula and high-quality teaching for growth in vocabulary and language skills.

The values in the second row suggest that children in classrooms with the enriched curriculum, regardless of whether they had high- or lower-quality teaching, received scores more than one-third of a standard deviation higher in emergent literacy skills, compared to children in classrooms without the enriched curriculum, regardless of teaching quality. This suggests that the enriched curriculum was more important than teaching quality in promoting growth in early literacy skills.

The values in the third row suggest that the combination of an enriched curriculum and high-quality teaching was especially important for growth in emotion recognition skills. When children were exposed to the enriched curriculum and high-quality teaching, they displayed the most growth.

This same finding held for growth in social problem-solving skills. However, the fact that the value for children in the small number of classrooms with the enriched curriculum but lower-quality teaching was just slightly smaller than the value for children in classrooms with the enriched curriculum but high-quality teaching suggests that the enriched curriculum was probably more important than teaching quality for growth in social problem-solving skills.

The pattern of scores for observer ratings of social competence suggests that the presence of the enriched curriculum might be especially important for helping children learn how to play positively with peers. The pattern of scores for observer ratings of aggression suggests that either an enriched curriculum or high-quality teaching can be effective in reducing problems in this domain.
Although there are several factors, such as selection effects and small numbers of classrooms in each cell, that qualify these results, the emerging pattern is provocative. These findings suggest that children did best in classrooms in which they receive an enhanced language-literacy and social-emotional curriculum provided in the context of high-quality teaching. There was one instance in which the high-quality teaching that naturally occurred in the control group classrooms appeared sufficient to prevent a negative outcome (i.e., observed aggression), but more often the enhanced curriculum appeared to partially compensate for the lower quality of teaching children might experience (i.e., emergent literacy skills, social problem solving skills, social competence, and aggression). These exploratory analyses help elucidate the results from the randomized-controlled trial and affirm the dual focus of the REDI intervention model on providing an enhanced curriculum and ongoing professional development to improve teaching quality.

Conclusions

Historically, in the field of early childhood education there has been debate about the use of explicit instruction to promote cognitive development (Elkind & Whitehurst, 2001). Those educators against the approach are concerned that this method has the potential to undermine teaching quality and children’s social-emotional well being by reducing sensitive responding and limiting child-initiated activities. Those educators in favor of explicit instruction hold that some children – particularly those children who are economically-disadvantaged and less likely to experience cognitively stimulating environments at home – are able to learn at faster rates with specialized instructional support than they could by relying on their own initiative (Landry, Swank, Smith, Assel, & Gunnewig, 2006). These educators advocate for a developmentally appropriate use of instruction which is a balance of teacher-directed and child-centered
approaches. Given the development and rapid dissemination of evidence-based academic and preventive interventions, many of which include some form of direct instruction, understanding this issue is critical to advancing the field of early education.

As described in this chapter, findings from the REDI trial demonstrate that it is possible to incorporate the use of explicit instruction to promote language, emergent literacy, and social-emotional skills while maintaining and even enhancing teaching quality (Bierman, Domitrovich et al., 2008; Domitrovich, Gest, Gill, Bierman et al., 2009). Implementation research has shown that for an intervention to be effective, it must be conducted with fidelity to the original model (Durlak, 2010). For a universal curriculum such as REDI, this involves more than just conducting an adequate number of lessons or activities (i.e., dosage) and includes delivering those components with quality. High quality delivery adheres to the content of the program, engages and supports students, and includes generalizing the core concepts of the intervention throughout the day (Dusenbury, Brannigan, Hansen, Walsh, & Falco, 2005). Data from the REDI trial indicate that high levels of implementation across all of these indicators was achieved and that variation in implementation was related to child outcomes (Domitrovich, Gest, Gill, Jones et al., 2009; Domitrovich, Gest, Jones, Gill, & DeRousie, 2010).

The REDI professional development model was intensive and included the combination of training workshops and weekly mentoring. The mentoring provided by the trainers included classroom visits, modeling, and support provided through a variety of methods including reflection, discussion, and goal setting. Our belief when designing the program was that this model was necessary in order to provide the implementation support that would be needed to integrate multiple curriculum enhancements into a Head Start program which already included a base curriculum necessary for achieving federal standards. Our results suggest that with REDI
trainer support teachers were able to make significant gains in multiple aspects of high-quality teaching. Moreover, those teachers who were open to consultation and receptive to our program tended to make the largest gains.

The professional development of teachers will be a critically important focus of future research on evidence-based interventions. There is general consensus that providing teachers with ongoing coaching when introducing new curricula and teaching practices is a promising approach that is more effective than the use of traditional in-service training alone (Haskins & Loeb, 2007), but very little is known about the ideal structure (e.g. frequency and intensity) that should be followed or the ways in which it might need to be adjusted to address the needs of individual participants. There is very little research on the mechanisms by which coaching has a positive impact on teacher behavior. In order to develop theoretical models of professional development, large scale studies of interventions that utilize various coaching strategies and that measure potential mechanisms of change are needed. The findings from these studies could then be used to develop standardized models to be tested in randomized trials. Including measures of individual and setting factors as moderators in these studies would enable further refinement of the models.

Recent studies have investigated the more general impact that preschool teaching quality has on child school readiness outcomes (Justice et al., 2008), and they suggest that curriculum interventions may be even more effective if they attend to and support teaching quality in more comprehensive ways, rather than simply focusing narrowly on the way that teachers are implementing specific lessons. When patterns of teaching quality were examined within the REDI control and interventions classrooms, it was the combination of the enriched curriculum with high-quality teaching that resulted in the greatest gains in children’s school readiness skills.
However, it was encouraging to see that the enriched curriculum could help children, even in the absence of high-quality teaching. Given that the promotion of high-quality teaching can occur in the context of implementing an empirically-based, structured, and enriched curriculum, it likely limits impact to focus on high-quality teaching outside of such context. Ideally, attention to the curriculum and teaching quality can be considered simultaneously in the planning of professional development for practitioners in early education settings. Training does not have to be provided in the same way for every individual and more targeted intervention may be needed for teachers whose basic skills are lacking. It may be that for certain teachers who exhibit lower teaching quality, an explicit curriculum provides the structure that they need to develop deeper knowledge about a content area and refine the practices that are needed to execute it effectively. The structure and scaffolding provided by the curriculum – and facilitated by coaching support – might be more effective for these teachers than trying to inculcate principles of good teaching more abstractly.

Given the higher cost of more intensive coaching, it is important to develop empirically-based decisions about the content of trainings, who they are delivered to, and when they are provided, so that training can be more cost effective to programs. For teachers who already display high-quality teaching, providing an enriched curriculum with relatively little professional support might be sufficient.

The collection of findings from Head Start REDI that are presented in this chapter suggest that enhancing the curriculum with evidence-based components and improving overall teaching quality should be considered as a comprehensive strategy to maximize the impact of the Head Start experience on children’s school readiness. The REDI findings add to the results from other studies (Dickinson & Sprague, 2001; Girolametto, Weitzman, Lefebvre & Greenberg,
2007; Wasik et al., 2006; Webster-Stratton, Reid, & Hammond, 2001) that suggest curriculum enhancements facilitate school readiness outcomes in settings that range in teaching quality, but that their effectiveness is optimized when they are implemented by teachers who also have good teaching skills.
References


Dusenbury, L., Brannigan, R., Hansen, W. B., Walsh, J., & Falco, M. (2005). Quality of implementation: Developing measures crucial to understanding the diffusion of


Table 1: Impact of Head Start REDI on Broad Summary Scales of Teaching Quality

<table>
<thead>
<tr>
<th></th>
<th>Control Group Mean (SD)</th>
<th>Intervention Group Mean (SD)</th>
<th>Effect Size (p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Emotional-Behavioral Support</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive Emotional Climate (TSRS)</td>
<td>2.52 (1.05)</td>
<td>3.18 (1.24)</td>
<td>.69¹*</td>
</tr>
<tr>
<td>Emotional Support (CLASS)</td>
<td>5.65 (.81)</td>
<td>5.97 (.45)</td>
<td>.39</td>
</tr>
<tr>
<td>Classroom Management (TSRS)</td>
<td>4.09 (.71)</td>
<td>4.32 (.67)</td>
<td>.60¹**</td>
</tr>
<tr>
<td>Positive Discipline (TSRS)</td>
<td>3.91 (.91)</td>
<td>4.39 (.72)</td>
<td>.65¹</td>
</tr>
<tr>
<td><strong>Cognitive-Linguistic Support</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instructional Support (CLASS)</td>
<td>3.76 (.72)</td>
<td>4.14 (.68)</td>
<td>.45+</td>
</tr>
<tr>
<td>Statements (CLEO)</td>
<td>5.77 (1.78)</td>
<td>7.03 (1.58)</td>
<td>.82***</td>
</tr>
<tr>
<td>Questions (CLEO)</td>
<td>2.98 (1.15)</td>
<td>3.95 (1.20)</td>
<td>.89***</td>
</tr>
<tr>
<td>Decontextualized Utterances (CLEO)</td>
<td>.61 (.64)</td>
<td>1.06 (.86)</td>
<td>.68**</td>
</tr>
<tr>
<td>Language Richness-Sensitivity (CLEO)</td>
<td>3.07 (.53)</td>
<td>3.41 (.44)</td>
<td>.67**</td>
</tr>
</tbody>
</table>

+ p < .10  * p < .05  ** p < .01  *** p < .001

¹ Because modal values tended to be near scale extremes for outcomes from the TSRS, random-effects ordered probit models were used to analyze treatment differences and estimate p-values. For the same reason, for outcomes from the TSRS, we are presenting Vargha and Delaney’s A, which is a nonparametric effect size estimate appropriate for any ordinal variable regardless of distribution, rather than Cohen’s d, which is sensitive to deviations from normality. An A of .56, .64, and .71 corresponds to a small, medium, and large effect size, respectively (Vargha & Delaney, 2000).
Table 2: Impact of Head Start REDI on Child Skills and Behaviors

<table>
<thead>
<tr>
<th></th>
<th>Control Group Mean (SD)</th>
<th>Intervention Group Mean (SD)</th>
<th>Effect Size (p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vocabulary</td>
<td>41.03 (11.24)</td>
<td>42.79 (11.55)</td>
<td>.15*</td>
</tr>
<tr>
<td>Emergent Literacy Skills</td>
<td>-.24 (.94)</td>
<td>.21 (1.00)</td>
<td>.45***</td>
</tr>
<tr>
<td>Emotion Recognition Skills</td>
<td>1.52 (.26)</td>
<td>1.61 (.24)</td>
<td>.23*</td>
</tr>
<tr>
<td>Social Problem-Solving Skills</td>
<td>2.29 (2.05)</td>
<td>3.16 (2.55)</td>
<td>.35**</td>
</tr>
<tr>
<td>Social Competence (Observer Ratings)</td>
<td>2.21 (.53)</td>
<td>2.36 (.49)</td>
<td>.26+</td>
</tr>
<tr>
<td>Aggression (Observer Ratings)</td>
<td>.37 (.34)</td>
<td>.30 (.31)</td>
<td>-.19</td>
</tr>
</tbody>
</table>

+ p < .10  * p < .05  ** p < .01  *** p < .001
### Table 3: Combined Effect of Enriched Curriculum and Teaching Quality on Children’s Outcomes

<table>
<thead>
<tr>
<th></th>
<th>High-Quality Teaching in the Intervention Condition</th>
<th>High-Quality Teaching in the Control Condition</th>
<th>Lower-Quality Teaching in the Intervention Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vocabulary</td>
<td>.13 (p = .09)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-.07&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.03</td>
</tr>
<tr>
<td>Emergent Literacy Skills</td>
<td>.37 (p = .001)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.03&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.37 (p = .01)&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Emotion Recognition Skills</td>
<td>.28*</td>
<td>.06</td>
<td>.17</td>
</tr>
<tr>
<td>Social Problem-Solving Skills</td>
<td>.35*&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-.02&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.33</td>
</tr>
<tr>
<td>Social Competence (Observer Ratings)</td>
<td>.39*</td>
<td>.32</td>
<td>.45+</td>
</tr>
<tr>
<td>Aggression (Observer Ratings)</td>
<td>-.36+</td>
<td>-.46*</td>
<td>-.49+</td>
</tr>
</tbody>
</table>

+ p < .10  * p < .05  ** p < .01  *** p < .001

Note: Values represent children’s growth in each kind of classroom, compared to children in classrooms with lower-quality teaching in the control condition. Superscript letters indicate additional significant differences (p < .05) between children in different kinds of classrooms. For example, children in intervention classrooms with high-quality teaching showed greater gains in vocabulary (β = .21, p < .01) than children in control condition classrooms with high-quality teaching. Although children showed less aggression if they were in any kind of classroom other than ones with lower-quality teaching in the control condition, there were no significant differences among children in the other three kinds of classrooms.