

Effects of Distance Coaching on Teachers' Use of a Tiered Model of Intervention and
Relationships with Child Behavior and Social Skills

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ABSTRACT

The purpose of this study was to investigate the effects of a professional development intervention on teachers' implementation of the *Teaching Pyramid* model. The *Teaching Pyramid* is a classroom-wide approach for fostering social-emotional development and addressing challenging behavior. The professional development intervention consisted of training and distance coaching. The study had two goals: (a) to examine the differential effects of training and distance coaching versus training alone on teachers' implementation of the *Teaching Pyramid* model, and (b) to examine relations between *Teaching Pyramid* implementation and child behavior and social skills. Participants were 33 Head Start teachers in nine centers that were assigned randomly to one of two treatment groups. Both groups participated in an interactive 1-day training on the *Teaching Pyramid* model and created individualized action plans. Following training, the training plus coaching group ($n=16$) received weekly distance coaching, via electronic mail, on their individualized action plans. The training only group ($n=17$) created individualized action plans but did not receive follow-up support on those plans. Outcome measures assessed teachers' implementation of the *Teaching Pyramid* model and changes in classroom social climate and teacher-child interactions. In addition, relations between teachers' implementation and changes in children's challenging behavior and social skills were examined. Two types of teacher-response methods (surveys, focus groups) were used to evaluate teachers' perspectives about and satisfaction with the professional development intervention. Distance coaching was associated with statistically significant improvements in classroom climate. Teachers who participated in distance coaching sessions more frequently had promising improvements in several outcomes. Implications of study findings for professional development research and practice are discussed.

To my parents, Tom and Reatha, for giving me an excellent start.

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CHAPTER I

INTRODUCTION

As more children participate in preschool and early care settings, a growing number of teachers report concerns about challenging behavior (Hemmeter, Corso, & Cheatham, 2006). Current estimates indicate between 10% and 20% of preschool children exhibit some form of challenging behavior (Campbell, 1995; Lavigne et al., 1996). Concerns about challenging behavior appear to be intensified among children in Head Start programs and those living in poverty (Kupersmidt, Bryant, & Willoughby, 2000; Qi & Kaiser, 2003). It has even been suggested that preschool attendance itself is associated with increased problem behavior (Magnuson, Ruhm, & Waldfogel, 2007). Challenging behavior in young children manifests in different ways. High intensity challenging behaviors in early childhood include aggression, fighting, non-compliance, property destruction, and social withdrawal. Early appearance of these behaviors has been associated with later delinquency, gang-involvement, and adult incarceration (Dishion, French, & Patterson, 1995; Reid, 1993). Less severe challenging behaviors like angering easily, arguing, and not forming friendships also occur and are reported by teachers as troubling (West, Denton, & Germino-Hausken, 2000).

Challenging behavior has long-range effects on educational performance. Gilliam (2005) found preschool children were expelled from preschool for behavior problems at a rate of nearly 7 per 1,000. This is three times the expulsion rate for school-age children. Even higher rates were found for boys and African American students. The stigma of challenging behavior often remains with children as they move through school. For entering kindergarteners, teachers' perspectives about challenging behavior or social skills are correlated with math, reading, and

general knowledge skills (West et al., 2000). While children with challenging behavior may experience punitive relationships with teachers and eventual school failure (Strain, Lambert, Kerr, Stagg, & Lenkner, 1983; Tremblay, 2000), better social skills are associated with greater school engagement and academic achievement (Perdue, Manzeske, & Estell, 2009).

The potential serious consequences of challenging behavior during the preschool years have highlighted the need for early prevention and intervention. Research has suggested behavior problems are best addressed before students enter the third grade (Dodge, 1993). Preschool offers a context for teaching young children the expectations for school success and identifying and addressing problems before they negatively impact a student's school career (Dodge, 1993; New Freedom Commission on Mental Health, 2003; Shonkoff & Phillips, 2001; Walker, Zeller, Close, Webber, & Gresham, 1999).

The *Teaching Pyramid* model (Figure 1) is a comprehensive prevention and intervention framework for promoting social-emotional competence and preventing challenging behavior (Fox et al., 2003). Based on a public health model, practices associated with the *Teaching Pyramid* are organized into three levels: universal/ primary strategies, targeted/secondary strategies, and individualized/ tertiary strategies. Specific strategies associated with each level of the *Pyramid* correspond to recommended practices in early childhood education. Practices organized under the universal (primary prevention) level of the *Pyramid* focus on supporting all children's social-emotional development and preventing challenging behaviors. These practices focus on fostering nurturing relationships and creating supportive environments. Examples of research-based strategies teachers would use at this level are supporting play, responding to children's conversations, specific praise, encouragement, adequate materials, balanced scheduling, structuring transitions, and teaching rules (Birch & Ladd, 1998; Bodrova & Leong,

1998; DeKlyen & Odom, 1989; Howes & Hamilton, 1993; Howes, Philips, & Whitebrook, 1992; Howes & Smith, 1995; Kontos, 1999; Mill & Romano-White, 1999; Peisner-Feinberg et al., 2000; Pianta, Steinberg, & Rollins, 1995). Practices organized under the secondary level of the *Pyramid* focus on providing children with targeted social and emotional supports. These supports include teaching children problem solving, handling anger, making friends, and communicating emotions (Denham & Burton, 1996; Domitrovich, Cortes, & Greenberg, 2007; Mize & Ladd, 1990; Schneider, 1974; Webster-Stratton, Reid, & Stoolmiller, 2008). Finally, teachers provide more intensive, individualized interventions to the small number of children who do not respond to primary and secondary supports (Carr et al., 1999; Duda, Dunlap, Fox, Lentini, & Clark, 2004). In addition to research supporting practices associated with each level of the *Pyramid*, ongoing investigations are evaluating the effects of applying the comprehensive, multi-component intervention in preschool classrooms (Fox, Hemmeter, Snyder, Clarke, & Binder, 2010; Hemmeter, Fox, & Snyder, 2010).



Figure 1. The *Teaching Pyramid*

While effective approaches for supporting social-emotional development and addressing challenging behavior have been identified, preschool teachers report feeling ill-equipped to respond to behavior difficulties (Casey, 2008; Hemmeter, Corso, & Cheatham, 2006). Early identification and support for social skill deficits and challenging behavior are key to preventing negative outcomes for children (Walker, Severson, & Feil, 1995). The challenge for the field is to identify effective professional development strategies that support implementation of practices that influence children's social and behavioral trajectories.

Professional development is a critical issue in early childhood settings. With the passage of *No Child Left Behind* (NCLB, 2008) and its early childhood counterpart, the *Good Start, Grow Smart* (U.S. Department of Health and Human Services, 2006) initiative, states were encouraged to hire qualified early childhood teachers and to create professional development systems that align with early learning guidelines (Martinez-Beck & Zaslow, 2006). In many states, efforts to develop professional development systems have been linked to the implementation of statewide quality rating systems (QRS) and quality improvement initiatives for early care and education settings (Child Care Bureau, 2007). As part of the 2009 American Reinvestment and Recovery Act, \$6.1 billion became available to states' IDEA part B and C programs, and \$100 million were made available for enhancing teacher quality (U.S. Department of Education, 2009). These initiatives have brought increased attention to the professional development needs of this diverse group of educators.

High quality professional development experiences have been defined as “teaching and learning experiences that are transactional and designed to support the acquisition of professional knowledge, skills, and dispositions as well as the application of this knowledge in practice” (National Professional Development Center on Inclusion; NPDCI, 2008, p.3). To facilitate the

dual focus on acquisition and application, three key elements of professional development are necessary. High quality professional development must consider the “who” of professional development (characteristics and contexts of adult learners, the children they serve, and those who design and deliver professional development), the “what” of professional development (the content, skill, or knowledge associated with the professional development experience), and the “how” of professional development (the method or format of the professional development experience). This study focused on social skills and challenging behavior as the “what” of professional development. The “who” and the “how” of professional development related to this content will be discussed in the following sections.

What do we Know about Early Childhood Professional Development around Challenging Behavior and Social Skills?

To describe the “who” and “how” of professional development around social skills and challenging behavior, a systematic literature review and best practice synthesis was conducted. Studies were included in the review based on four criteria: (a) the provision of professional development focused on social skills or challenging behavior, (b) a focus on children birth through age 5, (c) the inclusion of data on the effects of professional development on practitioner outcomes, and (d) the identification of practitioner behaviors as outcome measures rather than treatment fidelity measures. We identified 23 studies meeting these criteria in the literature through 2009. Sixteen of the 23 studies offered sufficient methodological rigor to be included in this synthesis. Characteristics of the 16 studies are shown in Table 1. We categorized and described these studies to determine what is known about early childhood professional development related to promoting social skills and addressing challenging behavior. Three themes emerged: (a) a variety of professional development approaches have been used in the

literature, (b) follow-up support is an effective strategy for supporting teachers to implement practices with fidelity, and (c) technology is a promising medium for providing professional development. The findings from this review guided the development of the research questions for the present study.

Table 1

Basic Features of Professional Development Studies

Study	Study Design	PD Content	Setting	Teacher Outcomes Examined (related to behavior or social skills)	Child Outcomes Reported (related to behavior or social skills)
Barnett (2008)	Randomized Control Trial	Tools of the Mind	Pre-K At-risk	ECERS-R CLASS	SSRS
Benedict (2007)	Multiple Baseline	PBS Implementation	Head Start & Pre-K At-risk	PBS Checklist	Problem Behavior
Domitrovich (2009)	Randomized Control Trial	REDI literacy curriculum; PATHS curriculum	Head Start	CLASS Teaching Style Rating CLEO (literacy)	None
Fullerton (2009)	Multiple Baseline	Specific Praise	University-based child care	Specific and non-specific praise	Engagement Compliance
Hendrickson (1993) Noell (2002)	Multiple Baseline Multiple Baseline	Social Interaction Behavior Plan Implementation	Childcare Kindergarten	Support Behaviors Plan Implementation	Social Interactions Out-of-Seat, Talking, Behavior Rating
Noell (2005)	Randomized Control Trial	Behavior Plan Implementation	Kindergarten	Plan Implementation	Behavior Change Index
Pianta (2008)	Randomized Control Trial	My Teaching Partner: Language and Literacy and	Pre-K At-risk	CLASS	None

Study	Study Design	PD Content	Setting	Teacher Outcomes Examined (related to behavior or social skills)	Child Outcomes Reported (related to behavior or social skills)
		PATHS curriculum			
Raver (2008)	Randomized Control Trial	Chicago School Readiness Project	Head Start At-risk	ECERS-R CLASS	None
Rusby (2004)	Randomized Control Trial	Carescapes	Family Childcare	Ecology Checklist	Positive Behavior
Rusby (2008)	Randomized Control Trial	Carescapes	Family Childcare	Ecology Checklist	Problem Behavior
Slider (2006)	Multiple Baseline	Behavior Management	Private Pre-K	Instruction-giving, Praise, Time Out	None
Stormont (2007)	Multiple Baseline	PBS Implementation	Head Start At-risk	Praise, Precorrection, Reprimand	Problem Behavior
Webster-Stratton (2001)	Randomized Control Trial	Incredible Years	Head Start At-risk	Classroom Management Composite	Conduct Composite (Engagement, Problem Behavior)
Webster-Stratton (2004)	Randomized Control Trial	Classroom Management	Pre-K & Kindergarten	Classroom Management Composite	Conduct Composite, Social Composite
Webster-Stratton (2008)	Randomized Control Trial	Incredible Years	Head Start & Kindergarten At-risk	Classroom Management Composite, Classroom Atmosphere	Conduct, School Readiness, Problem-Solving & Feelings Test

The “Who” of Professional Development: Participants and Setting

The participants in the identified studies represented the cross-sectional nature of early care and education. Studies took place in family child care ($n = 2$), center-based child care ($n = 1$), Head Start ($n = 6$), public and private preschool ($n = 6$), and kindergarten ($n = 4$). Three studies recruited practitioners from multiple settings. The majority of participants were white, college-educated women with approximately 10 years of teaching experience. Of the 448 participants from the 10 studies for whom demographic information was provided, 8% ($n = 36$) had high school diplomas, 11% ($n = 48$) had some college education, 35% ($n = 159$) had college degrees, and 11% ($n = 50$) had advanced degrees or graduate credits. Approximately 35% ($n = 155$) of the participants had a teaching certification or licensure.

Demographic information was provided for 519 of the 3728 children in the studies; 34% ($n = 177$) were girls and 66% ($n = 342$) were boys. The authors described 40% of children as coming from traditionally underrepresented ethnic or cultural groups, 17% as speaking English as a second language, and 10% as receiving special education services or having diagnosis that qualified the child for special education services. Approximately 35% of children were considered at-risk, and 25% had been referred specifically for behavior problems or concerns.

The “How” of Professional Development: Instructional Strategies

Two broad categories of professional development emerged from the 16 studies: (a) training without follow-up and (b) training with follow-up. Training was defined as a formal teaching or learning experience between a practitioner and a knowledgeable other that took place outside of the regular work context. Common characteristics across the studies in each broad category offer some insight into the practices associated with positive outcomes for teachers and

children. This section will describe training without follow-up. Subsequent sections will describe the role of follow-up and use of technology in professional development.

Training without follow-up. Despite the call for professional development that goes beyond traditional workshops (Odom, 2009; Sexton et al., 1996), four studies provided training without follow-up. All but one of these studies found at least small effects on teacher or child behavior following training. The only study with no significant effect on teacher or child behavior (Rusby, Taylor, & Marquez, 2004) provided one, brief video-based training to a group of childcare providers. This is the only study that used the “one-shot” model, and it is the only study that did not result in positive outcomes. The other three studies in this category (Rusby, Smolkowski, Marquez, & Taylor, 2008; Slider, Noell, & Williams, 2006; Webster-Stratton, Reid, & Hammond, 2001) offered a coherent series of training opportunities to teachers. Rusby et al. (2008) replicated the previously mentioned Rusby et al. (2004) study but expanded the training to include a coherent series of three group video-trainings on caregiver interactions. They found positive effects on teacher use of behavior management strategies. Slider et al. (2006) offered teachers a coherent series of three self-guided training modules. As teachers worked through the modules on instruction-giving, praise, and time-out, their use of these strategies increased as reflected by changes in level or trend. Finally, Webster-Stratton et al. (2001) provided 36 hours of training over six monthly group meetings. The training had a statistically significant effect on teachers’ classroom management composite scores. Taken together, these studies provide evidence that group training can be effective when it is coherent (Garet, Porter, Desimone, Birman, & Yoon, 2001). Although these findings might seem to contradict the wide-held understanding that workshops alone are ineffective at changing teacher practices (Fixen, Naoom, Blase, Friedman, & Wallace, 2005), the three studies in this category

with positive outcomes used PD approaches beyond traditional “one-shot” workshops. Because the authors did not provide sufficient information about the types of strategies and activities used during the training events, it was not possible to determine if any of the events after the initial training could be considered follow-up. It is clear, however, that (a) teachers were provided with a coherent system of training opportunities in which content built cumulatively and (b) teachers were provided with some opportunities for practice or application exercises in the training context. If teachers were given a chance to have reflective conversations, discuss problems with implementation, and brainstorm with others, each subsequent group training meeting may have functioned as a form of follow-up.

The role of follow-up. Previous literature reviews and meta-analyses have documented the importance of follow-up support for promoting skill application in context (Crow & Snyder, 1998; Joyce & Showers, 2002). In the current review, 12 studies examined the role of training plus follow-up in supporting teacher implementation of classroom practices. Descriptions of the specific types of follow-up support provided in each of the 12 studies are shown in Table 2. Follow-up support involved a variety of strategies across these studies including: support related to implementation of a specific curriculum (Barnett et al., 2008; Domitrovich et al., 2009; Pianta, Mashburn, Downer, Hamre, & Justice, 2008; Raver et al., 2008; Webster-Stratton, Reid, & Hammond, 2004, 2008), support related to classroom behavior management strategies (Benedict, Horner, & Squires, 2007; Fullerton, Conroy, & Correa, 2009; Stormont, Smith, & Lewis, 2007), consultation around individualized behavior support plans (Noell, DuHon, Gatti, & Connell, 2002; Noell et al., 2005), and coaching on a discrete skill (Hendrickson, Gardner, Kaiser, & Riley, 1993). Because the studies in each category have similar characteristics, discussion of the 12 studies will be organized around content categories: curriculum support,

classroom management support, behavioral consultation, and coaching on a discrete skill. Then broader applications of performance feedback from the early childhood professional development literature will be discussed to provide a foundation for the feedback strategies used in the current study.

Table 2

Professional Development Characteristics

Citation	Follow-Up	Agent	Format	Content	Length	Frequency	Training/ Follow-Up	Effective? Adult, Child
Barnett (2008)	Y	E	I, L	-	1 yr	Weekly	24h/25h	Yes, Yes
Benedict (2007)	Y	E	I, L	DE	8 wk	-	1h/6h	Yes, No
Domitrovich (2009)	Y	E	D, L	DA	1 yr	Weekly	24h/128h	Yes, -
Fullerton (2009)	Y	E	I, W	DA	6 wk	Daily	1.5h/.75h	Yes, Yes
Hendrickson (1993)	Y	E, P	D, L	DA	1 yr	Weekly	0/3h	Yes, Yes
Noell (2002)	Y	E	I, L	DA	6wk	Daily	3h/1h	Yes, Yes
Noell (2005) Weekly	Y	E	D, L	DE	3 wk	Weekly	3h/.5h	No, No
Noell (2005) Commitment	Y	E	D, L	DE	3wk	Weekly	3h/1h	No, No
Noell (2005) PFB	Y	E	D, L	DA	3wk	Daily	3h/2.6h	Yes, Yes
Pianta (2008)	Y	E	D, W	DE	1 yr	Monthly	6h/5h+	Yes, -
Raver (2008)	Y	E	I, L	DA	1 yr	Weekly	30h/82h	Yes, -
Rusby (2004)	N						2.5h/0	No, No
Rusby (2008)	N						9h/0	Yes, Yes
Slider (2006)	N						1h/0	Yes, -

Stormont (2007)	Y	E	I, L	DA	6 wk	Daily	4.5h/.25h	Yes, Yes
Webster-Stratton (2001)	N				1 yr		36h/0	Yes, Yes
Webster-Stratton (2004)	Y	E	D, L	DE	1 yr	Infreq	32h/2h	Yes, Yes
Webster-Stratton (2008)	Y	E	I, L	DE	1 yr	Daily	28h/28h	Yes, Yes

Note. Dashes indicate the information was not provided. Agent: E=Expert, P=Peer, S=Self; Format: I=Immediate, D= Delayed, L=Live, W=Web, S=Self-Reflective. Content: DE=Descriptive performance feedback, DA=Data-based performance feedback.

Curriculum studies. In seven of the 12 studies, follow-up support focused on teachers' implementation of a specific curriculum or package of skills. These studies evaluated professional development to support implementation of the Incredible Years social-emotional curriculum (Raver et al., 2008; Webster-Stratton et al., 2004, 2008), Tools of the Mind (Barnett et al., 2008), My Teaching Partner Language and Literacy Curriculum (Pianta et al., 2008), and PATHS social-emotional curriculum (Domitrovich et al., 2009; Pianta et al., 2008). All studies in this group offered 3-5 days of training concentrated in the summer prior to the study (Barnett et al., 2008; Domitrovich et al., 2009; Pianta et al., 2008) or dispersed over several months during the school year (Raver et al., 2008; Webster-Stratton et al., 2008). The intensity of follow-up varied across studies. The follow-up support provided in these studies can be characterized in two ways: (a) supportive follow-up that was only loosely anchored in implementation fidelity or (b) performance-based follow-up that was firmly anchored in observations of the teacher's implementation. The focus of supportive follow-up was on providing comfort, encouragement, or resources. It did not include specific information about a teacher's classroom practice. Performance-based follow-up, or performance feedback, was rooted in observation and included the provision of information about the teacher's practice.

Supportive follow-up was provided in two studies (Barnett et al., 2008; Raver et al., 2008). Barnett et al. (2008) offered teachers weekly 30 min classroom visits from a Tools of the Mind trainer throughout the school year and a series of five lunchtime group meetings to discuss aspects of the curriculum. No further description of the classroom visits or group meetings was provided. There was no indication that teachers received information or feedback about their implementation of practices in the classroom. As a result of the intervention, only one of the ten dimensions of the Classroom Assessment Scoring System (CLASS; Pianta, LaParo, & Hamre,

2008) showed significant improvements from pre- to post-test. This increase on the Productivity dimension may have reflected the availability of curriculum materials and focus on active engagement in the Tools of the Mind program rather than changes in teacher-child interactions. Despite the lack of effects of the professional development intervention on CLASS scores, there were noteworthy effects on overall ECERS-R (Harms, Clifford, & Cryer, 2005) scores ($d=2.0$). This change was especially pronounced on the Activities subscale. These results suggest that training and limited classroom support might be associated with changes in environmental characteristics as measured by the ECERS-R or availability of instructional activities as measured by the Productivity dimension of the CLASS. Limited follow-up might not be associated with relational or interpersonal dimensions of classroom quality, such as patterns of interaction, interpersonal warmth, or language modeling.

Raver et al. (2008) conducted a professional development intervention in which the content focused on the Incredible Years curriculum as part of the Chicago School Readiness Project. Teachers in the intervention group attended five 6-hour Saturday trainings. These trainings were accompanied by weekly mental health consultation visits in the classroom from a social worker for the duration of the school year. These consultation visits lasted approximately 4.5 hours per week and included “coaching,” “stress reduction,” and working individually with children. Although the study examined the effects of the Incredible Years curriculum, the authors did not describe how, or whether, the mental health consultants supported implementation of the curriculum. Effect sizes on the CLASS ranged from $d = 0.52$ on the Behavior Management dimension to $d = 0.89$ on the Positive Climate dimension. The effect size on Teacher Sensitivity was $d = 0.1$, but the term was not significant. These results indicate that supportive visits not anchored in fidelity to specific curricular practices or consultation protocols might be useful at

improving teacher-child interaction. Such coaching was not, however, associated with changes on measures of instructional quality as measured by the CLASS.

Fidelity of implementation of a practice, set of practices, or a multi-component intervention has been identified as a goal of professional development (Fixen, Naoom, Blase, Friedman, & Wallace, 2005; Odom, 2009) and was the focus of follow-up in three studies in this review. Webster-Stratton et al. (2008), Domitrovich et al. (2009), and Pianta et al. (2008) provided follow-up that was anchored in a specific curriculum or measurement system. In evaluating training on the Dinosaur School program of the Incredible Years curriculum, Webster-Stratton et al. (2008) provided teachers with 4 days of training, lesson plans, videotaped models, and teaching materials. Additionally, a certified research staff member co-taught all Dinosaur School lessons with the trained teacher to ensure fidelity. The goal of this professional development intervention was to increase teachers' use of universal, positive classroom management strategies and to examine subsequent associations between teachers' implementation of the Dinosaur School curriculum and children's social-emotional competence. The intensity of follow-up was greater than the Barnett et al. (2008) study, and unlike Raver et al. (2008), follow-up was anchored in implementation fidelity. Effect sizes on Webster-Stratton's (2008) measures, comparable to CLASS dimensions, ranged from 0.51 on the warmth/affectionate scale to 1.24 on the effective discipline scale (it is not clear how effect sizes were computed, however). Webster-Stratton et al. (2008) also measured children's ability to problem solve and identify emotions. They found that children whose teachers had received in-service training with follow-up on the Incredible Years curriculum scored significantly higher on both measures than teachers in the no-treatment control group. Effect sizes for problem solving and emotion identification, however, were small ($\eta^2 = 0.01$ and $\eta^2 = 0.14$, respectively).

While anchoring feedback in implementation fidelity, Domitrovich et al. (2009) offered a “mentor” model of follow-up. The study examined Head Start teachers’ implementation of the REDI language and literacy curriculum and the PATHs social-emotional curriculum. Following 3 days of training, master teachers provided weekly coaching support in the classroom. Visits lasted approximately 3 hours per week and included modeling, working with children, and providing ongoing feedback around implementation of structured curriculum lessons. Domitrovich et al. reported statistically significant effects on two CLASS dimensions: Positive Climate and Teacher Sensitivity. They also reported statistically significant effects on the CLASS Instructional Support domain which includes items that measure Instructional Learning Formats, Concept Development, Quality of Feedback, and Language Modeling. Based on additional coded observations, teachers who received coaching used more utterances and had richer, more sensitive conversations with children than teachers who participated in traditional Head Start in-service trainings. The effects were statistically significant. Effect sizes were moderate ($d = 0.39 - 0.61$).

In the My Teaching Partner study (MTP; Pianta et al., 2008), group training on the My Teaching Partner Language and Literacy Curriculum and the PATHs curriculum was followed by bi-monthly, web-mediated follow-up. The program and its associated website allowed teachers to view video clips of target instructional skills, access lesson plans from both literacy and social-emotional curricula, and engage in video feedback sessions with a trained coach. MTP used the CLASS (Pianta, LaParo, & Hamre 2008) as a systematic consultation tool. Teachers submitted 20 min videos of their own classroom practices. Coaches used these videos to rate the teacher on CLASS indicators and provide ongoing feedback and support around these indicators. Relative to teachers who had only “on-demand” access to web-based video exemplars and lesson

plans, participation in web-mediated coaching was associated with statistically significant change on three CLASS dimensions: Teacher Sensitivity, Instructional Learning Formats, and Language Modeling.

Classroom behavior management studies. Three studies examined follow-up focused on observation and feedback of teachers' use of Positive Behavior Support strategies (Benedict et al., 2007; Fullerton et al., 2009; Stormont et al., 2007). Following an initial 1 hr training, Benedict et al. (2007) provided approximately seven consultation visits. Visits included written feedback on teachers' use of three discrete PBS strategies: classroom materials (rules, schedule, etc.), transitions (use of warnings, signals, precorrection), and classroom routines (specific praise, ratio of positive to negative comments, recognition for following rules). The specific content of feedback was based on an individualized written action plan for each classroom. Based on visual analysis of single-subject experimental data, there was a clear increase in percent of PBS elements used with the onset of training. All teachers reached 100% implementation of targeted practices during at least one observation following staff development with follow-up. There was not, however, a functional relation between teachers' implementation and changes in children's challenging behavior.

Stormont et al. (2007) investigated the effects of follow-up support around PBS practices. The authors chose two discrete skills upon which to focus professional development: praise and precorrection. Stormont et al. calculated the frequency of praise statements and reprimands within intervals. They also recorded the occurrence or nonoccurrence of precorrecting expectations prior to beginning the planned lesson. A multiple baseline design across three teachers was used to evaluate the effects of the professional development intervention. With the introduction of training plus feedback, there were clear changes in level of specific praise for two

participants. The third participant showed a change in trend. There was no effect on reprimands, but this was a corollary measure of an untrained skill. There was a clear decrease in child challenging behavior with the onset of treatment in each tier. For one child, there was a clear change in level; for a second child, there was a clear reduction in variability and overall level; and for the third child there was a clear change in trend and level.

Fullerton et al. (2009) evaluated the effects of training and feedback on one strategy associated with Positive Behavior Support, descriptive praise. Following a 2 hr training, teachers were videotaped daily during targeted transitions. Videotaped observations lasted 5 min each day. Based on the video, the investigators provided written feedback on each teacher's rate of descriptive praise. Feedback was delivered on a handwritten note or via email but did not follow an explicit protocol. There was a clear increase in teachers' use of descriptive praise following training with feedback. There were also corollary increases in child engagement and compliance. Taken together, Benedict et al. (2007), Stormont et al. (2007), and Fullerton et al. (2009) offer promising evidence that feedback on discrete behaviors can increase teachers' implementation of practices associated with a positive behavior support framework.

Individualized behavior consultation studies. The consultation literature provides additional evidence of the effects of feedback on teachers' use of behavior support strategies or recommended practices, even in the absence of workshops or other organized teaching or learning experiences. In two studies identified in the systematic review (Noell et al., 2002, 2005), professional development began immediately in the teachers' practice settings and did not involve a group training event before classroom support and feedback were provided. Learners received "on-the-job" experiences and feedback around implementing individualized behavior support plans.

Noell et al. (2002) and Noell et al. (2005) measured teachers' implementation of behavior plans for individual children. These two studies demonstrated the effectiveness of performance feedback relative to other follow-up strategies such as data review and social reminders. Noell et al. (2002) used a nonconcurrent multiple baseline design to examine the effects of data review and performance feedback on plan implementation. Data review alone was associated with variable plan implementation for three of the four teachers (including the only kindergarten teacher). When teachers failed to meet implementation criteria over two or more days, performance feedback was introduced. Performance feedback was associated with nearly 100% implementation across teachers. Noell et al. (2005) designed a group experiment to evaluate the differential effects of three different kinds of consultation support: (a) a brief weekly interview to evaluate the plan; (b) commitment emphasis (CE) support which included the elements of weekly feedback but added a reminder about the importance of plan implementation; and (c) performance feedback (PFB), which consisted of reviewing the plan and graphing student and teacher behavior. Noell et al. (2005) found a large effect size for condition ($\eta^2 = .81$). Using the Tukey Honestly Significant Different test, they found a statistically significant difference between the PFB condition and the other two conditions. Weekly follow-up and CE were not significantly different from each other. The PFB condition was associated with higher levels of plan implementation, but the effect was small ($\eta^2 = .25$). Interestingly, the authors found that plan implementation peaked during the first week of intervention across all three types of consultation support and remained below Week 1 levels throughout the remainder of the study.

Coaching study. The final study identified in this review provided teachers with coaching on discrete skill performance without initial training. Hendrickson et al. (1993) evaluated expert and peer coaching on teachers' supportive interactions with young children and children's social

interactions. A multiple baseline design across three participants was used. Coaching sessions occurred in the morning before an observation and followed an 8-step feedback protocol about the previous observation. Items on the protocol included: what the teacher liked about the session, what the teacher wanted to change about the session, data from observation of the teacher, data from observation of the child, anecdotal notes about behaviors to continue, anecdotal notes about behaviors to modify, a teacher goal statement, and a discussion of what the teacher might try next time. This protocol was reviewed verbally with the teacher and provided in writing. Feedback sessions lasted approximately 20 min and occurred 2-3 times per week for approximately 4 weeks. Following the onset of coaching, there were changes in the level and slope of teachers' supportive interactions for each of the participants. There were also increases in child-child interactions across all participants.

Characteristics of effective follow-up. Although the studies in the systematic review demonstrated the effectiveness of a variety of follow-up strategies for supporting teachers to learn new skills, the seven professional development interventions that were associated with teachers' implementation of targeted practices shared a common characteristic: performance feedback. Taken together, these studies support the use of performance-based feedback as part of a professional development intervention in early childhood, particularly when the application of new skills in typical practice settings is desired. In studies using performance feedback, teacher behavior is monitored and the teacher receives information about a "particular aspect of his or her behavior following its completion" (Cooper, Heron, & Heward, 2007, p. 262). In addition to the social and behavioral applications of performance feedback described previously, the professional development literature from various content areas supports positive effects of performance feedback on early childhood teachers' classroom practices and offers guidance

about how feedback should be delivered. Performance feedback has been delivered effectively via verbal communication (Cooper, Thomson, & Baer, 1970; Schepis, Ownbey, Parsons, & Reid, 2000), verbal and written feedback (Mudd & Wolery, 1987), verbal and graphic feedback (Casey & McWilliam, 2008; Cotnoir-Bichelman et al., 2006; Kaiser, Ostrosky, & Alpert, 1993), verbal and video-based feedback (Venn & Wolery, 1992), and written feedback delivered via email (Barton & Wolery, 2008; Hemmeter, Snyder, Kinder, & Artman, 2010). This section will describe feedback delivered in person. The following section will describe technology-mediated feedback delivery.

Two studies provide examples of the effects of verbal feedback on implementation of a practice. Schepis et al. (2000) provided brief training and verbal feedback to paraprofessionals about their use of task analysis sequences, prompting, reinforcement, and error correction. Verbal feedback followed a 7-step protocol: use a positive opening, praise correct skill use, identify incorrect skill use, describe how to perform skill correctly, provide opportunity for questions, plan for next observation, and use an encouraging closing. Feedback lasted approximately 5 min and occurred at the end of each observation until the paraprofessional reached a criterion of 80% correct performance. Following training with feedback, all participants reached or exceeded the 80% criterion. Cooper et al. (1970) used verbal feedback to increase teachers' attention to positive child behaviors. Following a brief training on the definitions of appropriate child behaviors and adult attention, teachers were observed and notified every 10 min of their rate of attention to appropriate child behavior. At the end of each daily observation, teachers were told their total daily rate of attending to positive behavior and their total daily rate of missed opportunities. There was a clear increase in attending behavior for

one of the two participants. It is difficult to isolate the effects of performance feedback and training on teachers' implementation of practices in both Schepis et al. and Cooper et al.

Mudd and Wolery (1987) used written and verbal performance feedback following training to improve teachers' use of incidental teaching techniques. Following a 20 min observation, researchers provided teachers with a notecard containing the number of child requests and the percentage of incidental teaching steps completed. Verbal feedback began 2 weeks after training and continued weekly if teachers fell below criterion. Verbal feedback took approximately 10 min and included positive and constructive feedback.

Graphical feedback has been used to share quantitative representations of a teacher's classroom performance. Kaiser et al. (1993) used verbal and graphical feedback to increase teachers' accurate implementation of milieu language teaching strategies and environmental arrangement strategies. Casey and McWilliam (2008) used graphical feedback to increase the use of incidental teaching by teaching teams (lead teacher and assistant teacher). Each team was told the number of intervals in which incidental teaching occurred for a child with a disability. In both studies, the data from each observation were graphed and shared with the team immediately before the next observation. Cotnoir-Bichelman et al. (2006) trained undergraduate students to reposition infants with physical disabilities and provided feedback on the frequency and nature of each position change. Students were taught to chart the positions each child experienced and the number of times a child was positioned. Their supervisor provided verbal feedback on the number of positions for each infant, the number of changes, and the number of failed opportunities to reposition a child. When supervisor verbal feedback was faded, student teachers continued to chart their behavior and maintained their levels of performance.

Venn and Wolery (1992) used videotaped observations to provide expert and self-initiated feedback to day care staff. Staff participated in a series of four brief trainings. The final two training sessions consisted of videotaped observations of the staff member interacting with an infant during diapering routines. The experimenter and participant watched the videos and wrote down examples of adult behaviors and infant responses. They also identified other games the staff member could play. Following this intervention, game-playing and infant initiations increased and maintained across all participants.

Web-mediated performance feedback. Sheridan, Edwards, Marvin, and Knoche (2009) have suggested research should examine how delivery of training and coaching affect skill acquisition and practice. As more teachers gain access to technology and web-based communication options grow, the Internet has become a mechanism through which performance feedback might be delivered. Only four studies identified in this review used electronic media to deliver performance feedback. In two studies, email feedback was used to increase pre-service and inservice teachers' discrete verbal behaviors such as descriptive praise and expansions (Barton & Wolery, 2007; Hemmeter et al., 2010). Barton and Wolery (2007) provided email feedback with verbatim examples of preservice teachers' utterances and frequency counts of the expansions and descriptive praise delivered to children. Feedback was associated with an increase in expansions. Effects were greater when feedback was provided only for expansions as compared to feedback provided for both expansions and descriptive praise. Hemmeter et al. (2010) also provided feedback on teachers' use of descriptive praise. A multiple probe design across four teachers was used. Following a 30 min individual training, coaches used a 5-step protocol to deliver email feedback to Head Start teachers. Feedback included a friendly opening, positive feedback, corrective feedback, planning for the future, and an encouraging closing

statement. There was a functional relation between email feedback and teachers' use of descriptive praise across all teachers. For two teachers, additional supports were necessary. These included goal setting and visual supports. These studies demonstrate that email might be a promising delivery mode for providing performance feedback.

In two studies, more comprehensive systems of on-line support were used that included access to a personalized website, video models, and expert coaching (Pianta et al., 2008; Powell, Diamond, Koehler, & Burchinal, in press). Both interventions involved bimonthly feedback on literacy or social-emotional curricula. In the My Teaching Partner study (MTP; Pianta et al., 2008), the program and its associated website allowed teachers to view video clips of target instructional skills, access lesson plans from both literacy and social-emotional curricula, and engage in video feedback sessions with a trained coach. The coach selected video clips from each teacher's classroom to share with the teacher and prepared written feedback to accompany each clip. Feedback was anchored in observations of the teachers using the CLASS. Teachers were expected to respond in writing to the coach's feedback. Additionally, the teacher and coach met via iChat every 2 weeks to discuss the feedback. Teachers in this Web Consultation condition had more positive slopes on seven of the CLASS dimensions than teachers who only had "on-demand" access to video exemplars and lesson plans on the website, but the difference was not statistically significant. Slopes were significantly better for teachers in the Web Consultation condition on the three CLASS dimensions associated with interaction quality: Instructional Learning Formats, Teacher Sensitivity, and Language Modeling.

A similar coaching protocol was used to increase teachers' use of literacy practices (Powell et al., in press). For 15 weeks, teachers videotaped their literacy instruction and mailed the tapes to a trained coach. Like the MTP intervention, the coach selected segments to share

with the teacher and provided written feedback to accompany the clips. Videos and accompanying feedback were burned to a compact disc and mailed to the teacher every 2 weeks. A project website provided access to video exemplars and other content to aide implementation. The project also compared the effects of this distance coaching model to live coaching in the classroom. In the live coaching condition, coaches visited each classroom for approximately 90 min per week and met with the teacher for an additional 30 min per week to complete an Observe-Assess-Recommend cycle. There were statistically significant improvements in general classroom environments as measured by the Early Language and Literacy Classroom Observation (ELLCO; Smith, Dickinson, Sangeorge, & Anasatosopoulos, 2002) and on teachers' code-focused instruction for both groups. There were not, however, statistically significant differences between the distance and live coaching groups. This provides promising evidence that distance coaching can be a cost-effective alternative to live coaching.

Research Questions

With evidence that performance feedback is a promising strategy for changing classroom practices and evidence that technology might be a suitable medium for transmitting feedback, the focus of research can shift from “Does performance feedback work?” to “What particular forms of performance feedback work?” and “Under what circumstances, for which participants, and with what content do particular forms of performance feedback work?” (Sheridan et al., 2009). The current study was designed to address four gaps in the literature reviewed. First, few studies have used web-mediated professional development strategies to increase teachers' use of Positive Behavior Support frameworks like the *Teaching Pyramid* model. In particular, no studies have used video observations and performance feedback to support teachers as they use

multi-component interventions to prevent and address challenging behaviors. Such feedback has been used successfully to promote early literacy and social skills, so this is a natural extension. Given the sensitive nature of responding to challenging behavior and teachers' reported training needs, studies of professional development practices around behavior support strategies are an important contribution to the literature. Second, only three studies used a structured protocol for providing written performance feedback (Hemmeter et al., 2010; Hendrickson et al., 1993; Schepis et al., 2001). Standardizing and documenting the provision of feedback is an important step in understanding the key components of effective feedback. Third, most coaching and performance feedback studies in this review offered support over an entire academic year. Few studies have evaluated the effects of a short-term coaching relationship. It is unclear whether a coaching relationship can be established (a) at a distance and (b) over a short period of time. Such studies can help us understand the intensity of interventions necessary to affect changes in classroom practices. Fourth, few studies have examined the "value-added" effects of coaching relative to training alone. Comparing training alone to training plus coaching will help define the conditions under which teachers acquire and use new strategies. Finally, web-mediated professional development studies around social skills and behavior (Pianta et al., 2008) have not reported child outcomes associated with practitioners' training and follow-up. Because enhancing children's learning is the ultimate goal of professional development (Sheridan et al., 2009), this is a critical direction for professional development research. Given teachers' concerns about challenging behavior, it is especially important to measure and report the corollary effects of professional development interventions on children's challenging behavior.

The present study extends the early childhood professional development literature in three ways: (1) using a structured feedback protocol to deliver feedback via email on

professional development focused on a multi-component intervention, (2) measuring child outcomes associated with the content of distance coaching interventions, and (3) evaluating impacts of a brief coaching intervention following training. Distance coaching included systematic feedback and support (Pianta et al., 2008) that was: (a) focused on implementation of specific practices, (b) anchored in a validated measurement system, and (c) based on systematic consultation protocols. A randomized group comparison experimental design was used to address the following research questions:

1. What are the differential effects of training on the *Teaching Pyramid* with distance coaching (videotaped observation plus performance feedback) versus training on the *Teaching Pyramid* alone on teachers' implementation of practices associated with the *Teaching Pyramid* model? What are the effects of the professional development intervention on overall classroom climate and instructional quality?
2. What are the associations between teacher implementation of *Teaching Pyramid* practices and children's challenging behavior and social skills?

CHAPTER II

METHOD

Participants and Setting

Head Start centers. This study took place in a Head Start agency in the southeastern United States. The agency consisted of 14 Head Start centers across nine counties. No county had more than two centers, and the centers within each county were typically satellites of one another (e.g., a satellite classroom in a public housing community, additional classrooms in a local elementary school). All classrooms within a county were supervised by the same area manager and were considered one center by the Head Start administration. The term “center” is used to describe the cluster of classrooms within each of the nine counties. Therefore, there were 33 classrooms nested within nine centers. By agency request, teachers were recruited and randomly assigned to experimental conditions at the center/county level.

The investigator and the faculty advisor met with the Head Start Agency’s Professional Development Coordinator and Agency Director to explain the project and gain permission to recruit teachers. The faculty advisor had a previous professional relationship with the Head Start Agency. Several program-wide trainings on the *Teaching Pyramid* model had been provided over the previous 3 years, and two centers within the Head Start Agency had participated in previous research projects lead by the faculty advisor. One research project focused on literacy practices with individual children; the other research project focused on teachers’ use of descriptive praise. The investigator had worked as a research assistant on the two previous studies conducted within the Head Start Agency. The Professional Development Coordinator set up appointments for the investigator to visit each center to recruit teachers. No administrators were present during meetings with teachers. Teachers enrolled voluntarily in the study. They

could leave the study voluntarily at any time. All teachers who agreed to participate and completed all parts of the study received \$100 in classroom supplies.

Participants were enrolled in two cohorts. The first cohort of four centers ($n = 15$ teachers) was enrolled in January 2009 and completed the study in May 2009. The second cohort of five centers ($n = 18$ teachers) was enrolled in August 2009 and completed the study in December 2009. The professional development intervention was delivered at the center level. That is, all teachers in a center who consented to participate received the same intervention. Within each cohort, a randomized matched sample procedure was used to control for effects of program size on intervention outcomes. Each center was matched with another center of similar size. This accounted for potential differences in teacher characteristics, management style, and resources associated with small centers (fewer than three classrooms) and large centers (three or more classrooms). One center from each pair was randomly assigned to the training only group or the training plus coaching group. With one exception, all treatment group assignments were made within cohorts (i.e., centers were matched with other centers participating at the same time). The two largest centers in the Head Start agency were enrolled in separate cohorts. These centers were matched across cohorts and randomly assigned to training only or training plus coaching group. All other group assignments occurred within cohorts.

Teachers. Across cohorts, 33 teachers were recruited to participate in the study. All teachers completed the study. Teacher characteristics are shown in Table 3. All participants were women. Most of the teachers (48.48%) had an associates degree in early childhood education or its equivalent. Most of the teachers were White (72.72%) or African American (24.24%). Approximately 70% of teachers had less than 10 years experience in their current job. Overall, teachers in Cohort 1 were slightly older and more experienced than teachers in Cohort 2.

Inferential tests were used to determine whether these differences were statistically significant. Chi-square analyses were used to test for differences in the number of teachers in each age category across cohorts and treatment groups. Fisher's Exact Test was used because cell sizes were smaller than 5. Relative to the training only group, more teachers in the training plus coaching group were in the 30 – 39 year old age bracket, $\chi^2(1, N = 33) = 6.44, p = .01$. There were no other statistically significant differences in age across treatment groups or cohorts. One-way ANOVA was used to evaluate whether there were statistically significant differences in years of experience across treatment groups (training plus coaching versus training alone) and cohorts. Cohort 1 had more years of experience than Cohort 2, $F(1, 31) = 6.17, p = .02$. When cohorts were pooled, however, there were no statistically significant differences in experience across treatment groups, $F(1, 31) = 0.69, p = .41$.

Table 3

Demographic Characteristics of Teachers by Treatment Group

		Training Only	Training plus Coaching
<i>N</i>		17	16
Level of Education Completed	H.S.	17.65%	18.75%
	Associates	52.94%	43.75%
	Bachelors	29.41%	25%
	Masters	0	12.5%
Race or Ethnicity	African American	23.53%	25%
	Hispanic	0	6.25%
	White, non- Hispanic	76.47%	68.75%
Age	18-29	23.53%	18.75%
	30-39	5.88%	43.75%
	40-49	35.29%	18.75%
	50-59	35.29%	12.5%
	60+	0	6.25%
Yrs Experience	9.63 (7.55)	13.16 (10.43)	
No. children/class	15.41 (5.42)	16.56 (4.81)	
Children w/ IEP	8.33%	8.56%	
Children who are ELL	10.83%	10.71%	

Children. Data were collected on all children, in each participating teacher’s classroom, whose parents provided written consent. Consent was received for 409 children. Child participants included “typically developing” children and children with special needs. Children with and without identified behavior disorders were eligible for inclusion in the study. The average age of children participating in the study was 47.23 months (range: 16.30 – 64 months). Approximately 16.1% ($n = 66$) of children were under 3 years and were served in Early Head Start classrooms. Across cohorts, 36.77% of children were Caucasian, 34.13% were African American, 20.90% were Hispanic, 7.94% were described as “Other”, and 0.26% were Asian. Approximately 19.44% of children spoke a language other than English at home. Approximately 9% of children had individualized education programs/ individualized family service plans. Child demographics are shown by treatment group in Table 4 and by cohort in Table 5.

Table 4

Child Characteristics by Treatment Group

	Training Only			Training plus Coaching			<i>F</i>	χ^2	<i>p</i>
	<i>n</i>	%	<i>M</i> (<i>SD</i>)	<i>n</i>	%	<i>M</i> (<i>SD</i>)			
Age in months	216		46.66 (9.74)	188		47.89 (11.22)	1.39		.24
Missing	0	0		5	1.20				
Male	116	53.70		99	51.29		0.24		.69
Missing	0			0					
Below Avg Social Skills (SSIS)	46	24.73		41	26.11		0.09		.80
Missing*	30	13.9		36	18.70				
Above Avg Prob Behavior (SSIS)	56	30.11		26	15.29		8.59		.004
Missing*	30	13.9		36	18.70				
Attrition	18	8.33		12	6.22		0.54		.46
IEP	14	7.45		19	11.95		1.05		.31
Missing	28	13.00		15	7.80				
ELL	31	15.05		49	25.39		6.73		.01
Missing	10	4.60		0	0				
Race									
Af. American	84	41.79		51	26.84		9.66		.002
Am. Indian	0	0		0	0		-		-
Asian	0	0		1	0.52		0.94		.33
Hispanic	32	15.92		47	24.74		4.81		.03
White	72	35.82		74	38.95		0.46		.53
Other	13	6.47		17	8.95		0.87		.45
Missing	15	6.90		3	1.60				

Note. * indicates children under 3 years of age who were not included in analysis.

Table 5

Child Characteristics by Cohort

	Cohort 1			Cohort 2			<i>F</i>	χ^2	<i>p</i>
	<i>n</i>	%	<i>M</i> (<i>SD</i>)	<i>n</i>	%	<i>M</i> (<i>SD</i>)			
Age in months	190		48.31 (11.08)	214		46.27 (9.81)	3.87		.05
Missing	0	0		5	2.3				
Male	98	51.58		117	53.42			0.14	.71
Missing	0	0		0	0				
Below Avg Social Skills (SSIS)	40	24.24		47	26.40			0.21	.65
Missing*	25	13.20		41	18.70				
Above Avg Prob Behavior (SSIS)	43	22.63		39	18.22			0.81	.37
Missing*	25	13.20		41	19.15				
Attrition	12	6.32		18	8.22			0.54	.46
IEP	16	10.88		17	7.76			1.05	.31
Missing	43	22.60		0	0				
ELL	30	16.67		50	22.83			2.34	.13
Missing	10	5.30		0	0				
Race									
Af. American	66	38.37		69	31.51			2.01	.16
Am. Indian	0	0		0	0			-	-
Asian	0	0		1	0.46			0.79	.37
Hispanic	32	18.60		47	21.46			0.53	.47
White	67	38.95		79	36.07			0.29	.59
Other	7	4.07		23	10.50			5.70	.02
Missing	18	9.50		0	0				

Across cohorts, 91.21% ($n = 374$) of children completed the study. During Cohort 1, 12 children left the study. During Cohort 2, 18 children left the study. Most attrition was due to families moving away from the area. Three children in the training only group left the study because they began receiving special education services (for challenging behavior) in the public school system or with a different teacher. One child in the training plus coaching group moved for medical reasons. Children who left the study before completing four waves of data collection did not differ from children who completed the study in terms of age ($F(1, 337) = 3.72, p = .06$), social skills scores ($F(1, 337) = 2.95, p = .09$), race/ minority status ($F(1, 337) = 1.08, p = .29$), or gender ($F(1, 337) = .88, p = .35$). Children who left the study differed on the Problem Behavior scale of the SSIS, $F(1, 337) = 8.31, p = .004$. While 21% of children who completed the study were considered *Above Average* or *Well Above Average* on the Problem Behavior scale, 46% of children who left the study were considered *Above* or *Well Above Average*. Children who left the study left their classrooms. No children or families withdrew specifically from the research project.

Assignments to experimental conditions occurred at the center level. Children were not randomly assigned to centers (or classrooms within centers), so inferential statistical tests were conducted to test for differences in child characteristics between experimental conditions (children whose teachers were in the training only versus training plus coaching groups) groups and across cohorts. One-way ANOVAs and chi-square tests were used to determine whether there were differences between treatment groups prior to intervention. There were no statistically significant differences between the training only and training plus coaching groups on child age ($F(1, 403) = 1.39, p = .24$), gender ($\chi^2(1, N = 409) = .24, p = .69$), IEP status ($\chi^2(1, N = 366) = 1.05, p = .31$), or SSIS social skills risk status ($\chi^2(1, N = 343) = .09, p = .80$). There were,

however, significant differences between groups on the number of children identified as *Above Average* or *Well Above Average* on the Problem Behavior scale of the SSIS, $F(1, 342) = 8.59, p = .004$. More children in the training only group ($n = 56$) versus the training plus coaching group ($n = 26$) were identified as having problem behavior. There were also between-group differences on the percent of children who were English Language Learners, $F(1, 398) = 6.73, p = .01$. More children in the training plus coaching group ($n = 43$) versus the training only group ($n = 30$) spoke a language other than English at home. Additionally, there were statistically significant differences in the number of African American children ($\chi^2(1, N = 389) = 9.66, p = .002$) and Hispanic children ($\chi^2(1, N = 389) = 4.81, p = .03$) in each treatment group.

Children in Cohort 1 were approximately 2 months older ($M = 48.31$), on average, than children in the Cohort 2 ($M = 46.27$), $F(1, 403) = 3.87, p = .05$. This difference is logical given the timing of enrollment of each cohort. Cohort 1 began the study in January (midway through the preschool year), and Cohort 2 began the study in September (at the beginning of the following preschool year). Aside from a statistically significant difference in the number of children whose race was identified as “Other,” there were no significant differences between cohorts on any other demographic variables. Results of inferential statistical tests are shown alongside the demographic data in Tables 4 and 5.

Design

A randomized group experimental design was used to evaluate the effects of distance coaching on implementation of the *Teaching Pyramid* model. Teachers were randomly assigned to one of two groups: training only or training plus distance coaching. Matched sample random assignment occurred at the center level. Children were nested within classrooms, and classrooms

were nested within centers. Data collection occurred at four points in time for most classroom and child variables; one measure of classroom climate and instructional quality occurred pre- and post-intervention. Measurement occasions occurred approximately every 30 days. A timeline of all intervention and data collection procedures is shown in Figure 2.

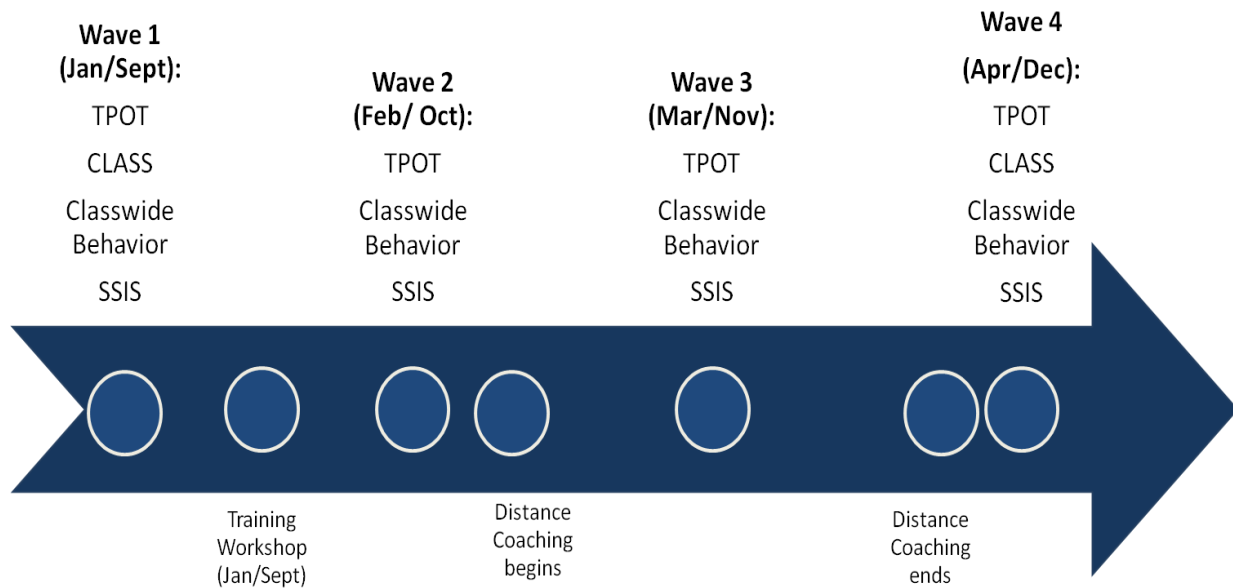


Figure 2. Intervention Timeline

Procedures

Workshop training. All teacher participants regardless of treatment condition or cohort participated in a 1-day (6 hr) training on the *Teaching Pyramid* model. The investigator conducted all trainings. Training took place on a regularly scheduled Head Start staff development day in January for Cohort 1 and September for Cohort 2. Only lead teachers were

recruited to participate in the study, but all center staff were invited to attend the training. In addition to the lead teachers, teaching assistants, area managers, family service coordinators, home-based providers, and staff development coordinators attended the training. Because school was not in session on the training days, classroom assistants ($n = 10$), area managers ($n = 3$), and staff development coordinators ($n = 3$) attended training.

Training consisted of PowerPoint presentations, discussions, video examples, materials, and action planning. Training content was adapted from that offered by the Center on the Social Emotional Foundations for Early Learning (CSEFEL; www.vanderbilt.edu/csefel). Training focused on two levels of the *Teaching Pyramid*: (a) high quality environments and creating nurturing relationships, and (b) teaching social-emotional skills. The first 3 hours of each training were dedicated to environments and relationships. The second 3 hours of each training were dedicated to social-emotional teaching. Teachers, regardless of group assignment, were provided with three implementation guides describing practical applications of the *Teaching Pyramid* strategies, a bag of classroom materials (one children's book, two puppets, laminated posters, scripted stories, visual cue cards), handouts, and action planning forms.

During training, each teacher developed a personalized action plan based on her interests and perceived needs. Teachers spent approximately 20 min developing action plans. Teachers in the training plus distance coaching groups and training only groups completed action plans. A sample Action Plan is shown in Appendix A. At the end of training, teachers completed a brief training evaluation.

Distance coaching. Following training, teachers in the training plus coaching condition participated in distance coaching sessions ($M = 6$; range: 1 – 8). Each coaching session consisted of a video-recorded observation, an edited video clip posted on the project's website, and e-mail

feedback. Each week a videographer visited the classrooms of teachers in the training plus coaching group and filmed 30 – 60 min of video footage. The exact length of each video varied based on the nature of the teacher’s action plan goals. For example, if a teacher’s goal was to reduce the duration of classroom transitions and use planned transition strategies, the videographer filmed brief classroom transitions. If the teacher’s goals dealt with circle time or centers, then the videographer filmed footage of the entire circle or center session. Prior to beginning filming, the investigator and videographer visited each classroom to discuss filming procedures and schedules. Teachers were provided with a coaching guide (typed information about logging onto the website, step-by-step screenshots for accessing the videos, password information, troubleshooting tips, contact information for the investigator) and a filming schedule. In addition to weekly videotaping sessions and email feedback, teachers in the training plus coaching group were given the opportunity to request additional, personalized materials (e.g., a set of visual cue cards, center signs). In total, 8 of these teachers requested additional materials.

For each weekly distance coaching session, the investigator viewed the video and identified short clips from each teacher’s video demonstrating examples of a target *Pyramid* practice or a missed opportunity for skill use. These clips were edited together into a brief (3-4 min) video montage using Pinnacle Software. Each week’s edited montage was posted on a password-protected website associated with the project (<http://pyramidcoachingproject.org>). The website was developed using Google Premiere Sites. Each teacher had her own personal username and password and saw only her videos and sample videos from CSEFEL. No other teachers, administrators, or Head Start officials could access the videos. If two teachers from the same classroom were participating in the study (co-teachers or a teacher and an assistant), the

teachers shared a log-in and password. Two teachers from the same classroom shared a log-in and password in only three classrooms.

After posting the video, the investigator/coach sent the teacher a follow-up e-mail. Teachers were provided with a free email address through the project website (e.g., suzy@pyramidcoachingproject.org). If teachers had a personal email account through another Internet provider, the follow-up email was sent to the project email address and the personal email address. None of the teachers in this study had an email account through the Head Start agency, and only four teachers used personal email accounts prior to the study.

Each email followed a specific feedback protocol (Appendix B). The email protocol had been used by the investigators in the past to coach Head Start teachers' on their use of descriptive praise (Hemmeter et al., 2010). Each email included a friendly greeting, positive feedback, corrective feedback including a video link, plan for the future, and an encouraging closing. The goal of each email was to describe the context of the video clips and help teachers reflect on their *Pyramid* practices. A sample email feedback message is included in Appendix C. This coaching process continued for up to 8 weeks.

Interventionist. All training and coaching was conducted by the investigator, a fourth year doctoral student. The interventionist had a valid early intervention teaching license, 3 years experience as a classroom teacher, 3 years experience as a childcare assistant, and 2 years of coaching/ professional development experience. She had participated as a coach in three previous studies on performance feedback in professional development (Hemmeter et al., 2010; Artman & Hemmeter, 2008; Hemmeter et al., in progress). One of these performance feedback studies had recruited participants from the Head Start program described in the current study. A previous literacy study on which the investigator was a research assistant also took place in this

Head Start program. Two teachers in the current study had participated in the performance feedback project, and one teacher had participated in the literacy project. Therefore, the interventionist had an existing relationship with these teachers. As a result of random assignment, the two teachers from the performance feedback study were in the training plus coaching group in Cohort 1 and the teacher from the literacy study was in the training only group in Cohort 1.

Measures and Data Collection

Five types of data were collected: (a) observational measures of procedural fidelity related to the coaching and training protocols, (b) teacher demographic measures, (c) teacher report measures of children's challenging behavior and social skills, (d) observational measures of *Teaching Pyramid* implementation, classroom climate, and classwide challenging behavior, and (e) teacher surveys to assess the social validity of training and coaching.

Procedural Fidelity Measures

Workshop training fidelity. Fidelity was assessed on the presenter's (investigator's) adherence to the group training protocol (Appendix D). A 32-item checklist was created. During each training, a member of the Head Start administration checked whether each element of the training occurred. To calculate percentage of fidelity to the protocol, the total number of items observed was divided by the total number of items planned (32 items) and multiplied by 100.

Action plan fidelity. A fidelity form was developed to ensure all teachers, across both treatment groups, created action plans of equivalent quality and content (Appendix E). The fidelity form consisted of 7 items. A graduate assistant completed a fidelity form for each action

plan. The total number of items observed was divided by the total number of items planned (7 items) and multiplied by 100.

Distance coaching fidelity. Procedural fidelity was assessed on coaching procedures (adherence to the email protocol; Appendix B) and on teachers' access to videos and email messages. All email messages were de-identified and forwarded to a trained research assistant. The research assistant randomly selected at least 25% of these messages per teacher and assessed fidelity to the email protocol. All emails from Cohort 1 were coded for fidelity, and 34.69% of emails from Cohort 2 were coded. The research assistant read each email and used a checklist to mark the presence or absence of the 5 steps of the email protocol. The total number of items observed was divided by the total number of items planned (5 items) and multiplied by 100. This produced a percent of fidelity to the email protocol.

Demographic Measures

Classroom demographic questionnaire. The classroom demographic questionnaire (Appendix F) was completed by each participating classroom teacher. This questionnaire was used to collect data on class enrollment and class composition. It also asked the teacher to report his or her level of education, years of experience, and participation in professional development activities. It took approximately 30 min for teachers to complete. When two lead teachers from the same classroom participated in the study, one teacher was identified as the primary contact ("lead" teacher) based on work schedules and preferences. This teacher's demographic information was included in all analyses.

Center profile. The center profile (Appendix G) was used to provide an overall description of the settings in which participating teachers worked. It was adapted from the

Organizational Readiness for Change scale (ORCS; Lehman, Greener, & Simpson, 2002). The center profile contained 46 items which center managers rated on a 5-point Likert scale with 1 = *Strongly Disagree* and 5 = *Strongly Agree*. Managers were asked to rate technology access, staff skill and knowledge, staff cohesion, and professional demands on the staff. The center profile was available as an online survey or as a paper survey. The profile contained 19 negatively worded items. These were reverse-coded in data analysis. To calculate a descriptive score for each center, the total number of points earned, after reverse-coding, was summed and divided by the number of items ($n = 46$). This created a score of 1 – 5, with a score of 5 indicating a center with high technology access, skilled staff, strong cohesion, and reasonable professional demands.

Teacher Report Measures of Social Skills and Behavior

Social Skills Improvement System Rating Scale. The Social Skills Improvement System Rating Scale (SSIS; Gresham & Elliot, 2008) is designed for teachers to report about the social skills and problem behaviors of children in their classroom. This tool is a revision of the Social Skills Rating System (SSRS; Gresham & Elliot, 1990). The SSIS was chosen for the proposed study because the revised edition includes a larger and more representative sample of preschool children in the normative group. The revised measure was also completely renormed. The normative sample for the SSIS was a representative national sample of 950 children between the ages of 3 -18; 200 of these children were preschoolers.

Preschool children are rated on two key SSIS domains: social skills and problem behaviors. Social skills are categorized as communication, cooperation, assertion, responsibility, empathy, engagement, and self-control. Problem behavior is categorized as externalizing, bullying, hyperactivity/ inattentiveness, internalizing, and autism spectrum. Teachers were asked

to complete the SSIS a total of four times. Teachers reported it took approximately 3 hours to complete an SSIS for a sample of 12 children. Teachers were encouraged to complete the measures over several days to avoid fatigue that might affect the reliability and validity of their ratings.

For the national sample of 950 children, the internal consistency score reliability (Cronbach's alpha) of the SSIS ranged from .75 - .97 with a median of .96. Test-retest score reliability on the Teacher Form had a median correlation of .84 (range: .74 - .93). Scores on the SSIS have been correlated with other measures of behavior and social skills including the SSRS. There is evidence for SSIS construct, content, and concurrent score validity provided in the SSIS manual.

The SSIS provides standard scores calculated from sex-specific norms for children ages 3 – 5. Standard scores have a mean of 100 and a standard deviation of 15. The Social Skills subscale is scored positively; higher scores are desirable. Because the Problem Behavior subscale assesses negative behaviors, lower scores are desirable. Because the SSIS has only been validated on children ages 3 – 18, children under the age of 3 years who were enrolled in the study were excluded from relevant analyses. This excluded all children in Early Head Start classrooms. Therefore, 66 children from 9 classrooms were excluded. The children excluded from the SSIS analyses did not differ from the larger sample on any characteristic other than age.

Observational Measures

Teaching Pyramid Observation Tool. The *Teaching Pyramid* Observation Tool (TPOT; Appendix H; Hemmeter, Fox, & Snyder, 2008) is a 38-item implementation fidelity measure of the *Teaching Pyramid* model. It was designed to assess the extent to which a teacher is using the

practices associated with each level of the *Teaching Pyramid*. The TPOT is completed during an observation in the preschool classroom and through a brief interview with the teacher.

Observations last approximately 2 hr and include observations of both structured (circle time) and unstructured (free choice) classroom activities. The observation is followed by a 15-20 min interview. The TPOT includes three types of items: (a) items that require a yes/no response based on observation ($v = 27$), (b) items that require a yes/ no response based on observation and an interview ($v = 4$), and (c) items that are rated based only on an interview ($v = 7$). The overall TPOT score is the percent of indicators for which a teacher scores “yes.”

The psychometric integrity of the TPOT is currently being investigated through a grant funded by the Institute for Educational Sciences (Hemmeter, Snyder, & Fox, 2009). Internal consistency score reliability, measurement dependability using Generalizability theory, and concurrent score validity between the TPOT and the Classroom Assessment Scoring System (Pianta, LaParo, & Hamre, 2008) are being examined. To examine the psychometric integrity of TPOT scores, data were gathered in 50 preschool classrooms. The design of the generalizability study involved two raters completing TPOT observations on three occasions across 50 classrooms. The CLASS was completed between the second and third TPOT observation in each classroom. Potential sources of error in TPOT scores included classrooms, raters, and occasions. The G study was conducted using a [c X o : r] design. Less than .01% of error variance was due to raters. The largest source of error variance was classrooms (82.9%). A small percentage of the variance (3.9%) was due to raters nested within occasions, and 0.9% of variance was due to classrooms x raters. The phi coefficient for these analyses was .96. Preliminary evidence of criterion score validity with the CLASS was found. The correlations between total TPOT indicators and the CLASS dimensions were moderately high in the sample of 50 classrooms

(Emotional Support = .71; Classroom Organization = .73; Instructional Support = .76). Pilot data were also collected in six classrooms to assess concurrent validity between the TPOT and the Early Childhood Environmental Rating System Revised (ECERS-R; Harms, Clifford, & Cryer, 1998). Spearman rho for this preliminary study was .54. The TPOT is being examined currently for use in intervention research (Hemmeter et al., 2009). Preliminary evidence suggests TPOT scores change when professional development interventions are introduced and remain stable in the absence of intervention.

Research assistants in the present study were trained to 80% agreement on the TPOT before data collection began. Training took place using videotaped classroom samples and live classroom observations in centers not associated with the study. One research assistant had been trained by the authors of the tool to establish “gold standard” coding practices. All research assistants met 80% agreement criteria with this gold standard coder over three consecutive observations before they began data collection. To prevent observer drift once coders were trained, interobserver agreement data were collected throughout the study on at least 25% of observations. Data collectors were blind to the treatment condition of each teacher they observed. Interobserver agreement was calculated by dividing the total number of exact agreements by the total number of agreements plus disagreements and multiplying by 100.

Classroom Assessment Scoring System. The Classroom Assessment Scoring System (CLASS; Pianta, LaParo, & Hamre, 2008) is an observational rating system designed to assess classroom quality and climate in preschool and elementary classrooms. Classrooms are assessed on ten dimensions: positive climate, negative climate, teacher sensitivity, regard for student perspective, behavior management, productivity, instructional learning format, concept development, quality of feedback, and language modeling. Each dimension is scored on a scale

of 1 – 7. With the exception of negative climate, which is reverse scored, lower scores are associated with lower quality classroom practices. Observations last approximately 2 hr and consist of at least four 20 min observation cycles, each of which is followed by a 10 min scoring cycle.

The CLASS has been used and evaluated in over 3000 classrooms. The authors offer systematic training procedures based on expert-rated “gold standard” video clips. Trained observers show relatively high interrater score reliability between .78 and .96. There is relatively high internal consistency score reliability across dimensions (range: .79-.91). In terms of criterion score validity, correlations between CLASS domains (emotional support, classroom organization, instructional support) and ECERS-R factors (space and furnishings, personal care routines, language and reasoning, activities, interaction, program structure, parents and staff) range between .33 and .63.

The CLASS was used as a pre- and post-intervention measure of classroom quality in the present study. It was completed prior to training and at the conclusion of the study in each classroom. Before data were collected, research assistants participated in the systematic training recommended by the authors of the CLASS. A member of the project staff was trained as a gold standard CLASS trainer by the developers of the CLASS and provided training to all project staff. Research assistants were trained to 80% agreement criterion on master-coded video sessions and at least one live classroom observation with another trained observer. To prevent observer drift, interobserver agreement data were collected on at least 25% of all observations. Data collectors were blind to the treatment condition of teachers. Interobserver agreement was calculated by dividing the total number of agreements on each dimension rating by the total number of agreements plus disagreements and multiplying by 100. As per the CLASS technical

manual (Pianta, LaParo, & Hamre, 2008), ratings that were within one point of each other (along the 1-7 scale) were considered an agreement.

Classwide challenging behavior. To estimate the overall frequency and intensity of challenging behavior in each classroom, a scan of incidences of challenging behavior was conducted. The observational coding system and operational definitions of behavior codes for this measure are provided in Appendix I. All data were collected on hand-held computers programmed with the MOOSES observational coding system and the associated codes (Tapp, Wehby, & Ellis, 1995). When using MOOSES, researchers must define each behavior code and program each behavior code into the MOOSES system. Observations lasted 30 min and consisted of three 10-min cycles. These data were collected during the four TPOT observations (pre-training, post-training, midway, and post-intervention). Data collectors paused their TPOT observations to collect behavior incidence data. Specific observation protocols and guidelines were developed for when to begin and end behavior incidence cycles within the TPOT observation. One of the cycles occurred during large group, teacher-directed activities; one cycle occurred during transitions; and one cycle occurred during free play/ child-directed activities. Data were collected on the type of activity (i.e., meal, large group, small group, child-directed, transition) and the occurrence or non-occurrence of challenging behavior by any child in the classroom.

Challenging behavior was categorized as high intensity or low intensity. Examples of high intensity behaviors included physical or verbal aggression, tantrums, property destruction, elopement, inappropriate or sexual touching, and self-injurious behavior. Low intensity behavior included not responding to instructions, name calling or teasing, taking toys from another child, clinging to parent or other adult, whining, and touching others when it is not part of a planned

activity. A 10-s, partial interval system was used to record the occurrence or non-occurrence of low intensity and high intensity behavior within each interval. Low and high intensity behaviors were summed, divided by the number of intervals observed, and multiplied by 100 to reach a percentage of intervals with challenging behavior. All data collectors were trained to 80% agreement criterion before data collection began. Interobserver agreement data were collected on at least 25% of all observations. Agreement was calculated using the point-by-point method. The total number of agreements during each interval was divided by the sum of agreements plus disagreements and multiplied by 100.

Social Validity Measures

Several measures were used to assess the acceptability of the goals, procedures, and outcomes of this study (cf. Schwartz & Baer, 1991). These data were collected through questionnaires completed by teachers. The data obtained from these measures were analyzed for patterns in responding.

Satisfaction with training questionnaire. Following training, all teachers were asked to complete a brief questionnaire about their experience with the training on the *Teaching Pyramid* (Appendix J). This questionnaire provided data on the perceived usefulness of training content, satisfaction with the format of the training, changes in knowledge and skill, and suggestions for improving the training.

Satisfaction with coaching questionnaire. After all data had been collected, teachers in the training plus coaching group were asked to complete a brief questionnaire about their experiences with the coaching procedures (Appendix K). They were asked to rate the usefulness

and adequacy of the coaching. Several open-ended questions asked teachers to comment on their experiences and provide suggestions for improving the distance coaching process.

Coaching focus group. After all data had been collected, the teachers in the training plus coaching group were invited to participate in a brief focus group conversation. A protocol was developed for this focus group (Appendix L). Teachers were asked to reflect upon their experiences and provide feedback on the coaching they received. Specific strengths, weaknesses, and areas of improvement for the coaching process were discussed. A primary goal of the focus group was to gain a clearer understanding of the processes by which Head Start teachers inform and improve their *Teaching Pyramid* practices. The investigator conducted all focus groups which were audio taped and transcribed by trained research assistants.

Data Analysis Plan

Procedures to ensure integrity in data collection and analysis were implemented during all stages of the study. Data collectors were blind to treatment condition, and data were double-entered to ensure accuracy. For Cohort 1's data set, a second research assistant independently compared each piece of raw data to the data originally entered in SPSS by the investigator. Corrections were made as necessary, but no record was kept of the disagreements or changes that were made. For Cohort 2, the investigator and a research assistant independently entered all data in two Microsoft Excel spreadsheets. The spreadsheets were compared using a procedure available in Microsoft Excel. When a disagreement was flagged, the investigator and research assistant checked the raw data file. If necessary, the primary database was corrected. For Cohort 2's TPOT file, there were 24 disagreements. The nine errors in the original spreadsheet were

corrected. The remaining 15 errors were in the double-entered file. For Cohort 2's CLASS file, there were no data entry disagreements. The classwide challenging behavior data from MOOSES and SSIS data were electronic files, so they were entered automatically. They were hand checked for accuracy by the investigator. The only errors in classwide challenging behavior files occurred when data collectors allowed the handheld devices to "fall asleep" during observations. When this type of error occurred, the investigator talked with the data collector to determine the cause of the error. In all cases, no challenging behavior had occurred, and the data collectors had forgotten to tap the screens periodically (to keep the machines awake) during the 10 min cycle. This occurred once during Cohort 1 and twice during Cohort 2. The errors were corrected by recoding the data stream for the affected intervals in each MOOSES event file.

After data were entered and verified for accuracy, appropriate exploratory analyses were conducted for each inferential statistical analysis reported. Key variables were evaluated for appropriate distributional properties and transformed when necessary to meet the assumptions of the statistical analyses. Results of exploratory analyses will be discussed in the Results section. Specific data analysis procedures for each research question are presented in this section. Power analyses appropriate to each research question were conducted during the development of the study and are presented here. To ensure sufficient power to detect treatment effects at all levels, the largest of the sample sizes required by the individual statistical analyses was selected.

Effect of Professional Development Intervention on Teacher Outcomes

Implementation of *Teaching Pyramid* practices. Repeated measures analysis of variance (ANOVA) with one within-subject factor (time), one between-subject factor (experimental condition), and the interaction (time X condition) was used to evaluate the effects

of the coaching intervention on implementation of the *Teaching Pyramid* practices as measured by the *Teaching Pyramid* Observation Tool (TPOT).

Statistical power for evaluating *Teaching Pyramid* implementation was calculated using StudySize 2.0 software (Olofsson, 2007). The desired alpha and power levels, the estimated standard deviation for the distribution of TPOT scores, estimated correlation among repeated measures, number of levels associated with the between and within subjects factors, and the estimated standard deviation of means were entered. Alpha was set at .05, and power was set at .8. Based on pilot work on the TPOT (Hemmeter, Snyder, & Fox, 2009), a conservative estimate of the standard deviation was set at 10 and the correlation between repeated measures was set at .4. Two levels were entered for the between-subjects factor representing the two treatment conditions. Because data were collected at four time points, four levels were entered for the within-subjects factor. To calculate the standard deviation of means (which results in the software calculating a non-centrality parameter/effect size estimate), we estimated the percent change in the percent of TPOT indicators implemented for each group at each time point. For both groups, we expected the percent change at Time 1 (baseline) to equal zero. At Time 2, we expected a 20% change in the training plus coaching group and a 15% change in the training only group following training. At Time 3, after 6 weeks of coaching, we expected a 25% change in the training plus coaching group in percent of TPOT indicators implemented as a result of coaching, whereas we estimated the training only group would change only 5% in the percentage of TPOT indicators being implemented, primarily due to continued access to materials. At Time 4, post-intervention, we expected a 15% change in the percentage of TPOT indicators implemented by the training plus coaching group versus 5% for the training only group. When all values were entered in the StudySize software, the analysis indicated a need for 9 teachers per

treatment group for a total of 18 teachers/classrooms with power of .80 and alpha of .05. Thus, the plan to recruit 32 teachers for the study should have ensured sufficient power to detect statistically significant treatment effects in relation to TPOT implementation scores, should a difference exist.

Classroom climate. Repeated measures multivariate analysis of variance (MANOVA) was used to examine whether changes in classroom interactional quality as measured by the CLASS occurred over time and in response to the intervention. The within-subjects factor (time), between-subjects factor (experimental condition), and the interaction (time X experimental condition) within/between factors were considered. In this analysis, the within-subjects factor had two levels for the two time points at which the CLASS was conducted. Two levels were associated with the between-subjects factor for treatment group condition. A repeated measures MANOVA was conducted using the three CLASS domain scores (i.e., emotional support, classroom organization, instruction support) as the dependent measures to reflect the multivariate nature of classroom climate and instructional quality as measured by the CLASS (Pianta, LaParo, & Hamre, 2008).

To identify the appropriate sample size, a power analysis was conducted using StudySize 2.0 software (Olofsson, 2007). The parameters were entered as described for the TPOT analysis. Again, alpha was set at .05 and power was set at 0.80. Based on information from the CLASS technical manual and other published research on the CLASS, the standard deviation was set at 10 (LoCasale-Crouch et al., 2006) and the correlation coefficient for the repeated measures was set at .5. As described above, the standard deviation of the means was calculated by entering hypothesized values of change across CLASS scores. For the training plus coaching group, we expected a 25% change in scores from pre- to post-intervention. For the training only group, we

expected a 10% change due primarily to maturation. With these values, a minimum sample of 20 teachers (10 per condition) was required. The research plan to recruit 32 teachers should have ensured adequate power to detect treatment effects on classroom climate.

Association between Teachers' Implementation of *Teaching Pyramid* and Child Outcomes

Classwide challenging behavior. Repeated measures analysis of variance (ANOVA) with one within-subject factor (time), one between-subject factor (experimental condition), and the interaction between (time X condition) was used to evaluate the effects of the coaching intervention on classwide challenging behavior. Classwide challenging behavior was measured using a 10-s partial interval system. Observations lasted 30 min. During each 10-s interval, observers coded whether a low intensity or high intensity behavior occurred by any child in the class during live observations. The number of intervals with low and high intensity behaviors were added together and divided by the total number of observed intervals to reach a total percentage of intervals with classwide challenging behavior. For each wave of data collection, a score was generated at the classroom level that reflected the percentage of intervals in which challenging behavior occurred. This score was used in the repeated measures ANOVA.

Child behavior and social skills. Hierarchical linear modeling (Raudenbush & Bryck, 2003) was used to estimate children's growth trajectories on the SSIS (Gresham & Elliott, 2008) over the course of the intervention period and to evaluate whether level and slope differed across the two intervention conditions. Because this study took place within one Head Start program with relatively similar staff and child characteristics across centers, it was anticipated that no statistically significant variance would be attributed to center level effects. Initial analyses confirmed this hypothesis, so center-level effects were not included in the model. The final

model contained time nested within children and children nested within classrooms. Using this model increased power to detect treatment effects. It introduced potential error into the design, however, because the level at which the effects of the professional development intervention was analyzed (child level) differed from the level of randomization (center level).

To build the hierarchical model, we analyzed unconditional statistical models for child social skills and problem behavior. This helped determine whether the SSIS social skills and problem behavior data fit a linear growth model. If necessary, quadratic models were developed to fit the shape of the data. Once an appropriate baseline unconditional model was constructed, a series of conditional models were specified. The following predictors were entered in the model: coaching (dummy coded independent variable), risk for problem behavior as defined by SSIS behavior level scores, and the interaction between coaching and problem behavior. Due to sample size restrictions and associated low statistical power, time-invariant covariates such as gender and race were not entered into the model. In addition, because standard scores were based on gender-specific norms for preschoolers, age and gender were accounted for in the standard score. A final model was specified that predicted the intercept and slope of a child's SSIS score from experimental condition and child problem behavior.

Because the *Teaching Pyramid* focuses on promoting social-emotional development and preventing and addressing challenging behavior, it was hypothesized that children identified with challenging behavior before intervention (at baseline) in the training plus coaching group would show differential effects of treatment relative to children without challenging behavior. To test this moderating hypothesis, an interaction term was included in the model. An analysis was conducted to evaluate whether children with higher problem behavior scores (those who might be defined by SSIS problem behavior scores as targeted or at-risk) showed more growth over

time than children with lower problem behavior scores or typical behavior. Similar analyses were conducted to test for differential effects on social skills.

The power analyses for child level SSIS data were calculated using Optimal Design Software (Raudenbush, Liu, & Congdon, 2004). Optimal design software works within nested designs to identify the number of clusters (classrooms) necessary to achieve sufficient power. For this analysis, the number of participants per cluster (n), alpha level (α), rho (ρ), the anticipated effect size (delta), the number of repeated measures (F), and the length of intervention (D) were entered. The number of participants per cluster was set at 12. This reflected the size of the child-level sample we anticipated recruiting within each classroom. Alpha was set at .2. This was consistent with guidelines for exploratory research within the Institute of Education Science goal structure. Rho was set at .05 and .1, and the effect size was set at 0.4. There would be four data collection points over one year, so F was set to 4 and D was set to 1. For minimally adequate power (.75-.80), these values indicated a need for 30 classrooms with rho at .1 and 26 classrooms with rho at .05. To account for potential attrition, 33 teachers were recruited. These 33 teachers were nested at the center level and randomly assigned to treatment conditions. Sixteen teachers received training plus distance coaching, and 17 teachers received training only. Because Early Head Start classrooms were excluded from the sample, we were only able to use 24 preschool classrooms for the SSIS analysis. The SSIS is only normed for children over 3 years of age, so standard scores could not be calculated for children in Early Head Start. Specific sample details are provided in the Results section.

Social validity. Open-ended teacher responses on questionnaires and during focus group discussions were the primary data sources for addressing research questions related to social validity. Social validity data were collected on teachers' responses to the *Teaching Pyramid*

model, the 1-day training event, and distance coaching. All written responses were collected, and the focus group meetings were audio taped and transcribed. Responses and transcriptions were analyzed for themes by trained coders (Onwuegbuzie & Teddlie, 2005). First, data were reduced into themes based on the exploratory analysis. Two coders independently segmented data and identified themes. This process was iterative and was repeated until both coders agreed upon themes. Next, data were displayed visually to highlight the connections between themes. All written responses and focus group transcriptions were double-coded by two independent coders to assess intercoder agreement (Tinsley & Weiss, 2000).

Ancillary analyses. During the study, some teachers in the training plus coaching group accessed the distance coaching website more often than others. With the exception of one teacher, all teachers had the opportunity to access at least 4 emails and video links. Table 6 shows the distribution of coaching sessions videos viewed and email responses by each teacher in the distance coaching group. Table 7 shows the total number of videos and emails viewed by each teacher. Ancillary analyses were conducted to describe and explore patterns in the data related to whether outcomes for the training plus coaching group differed based on level of “participation” in the distance coaching component of the professional development intervention.

Table 6

Video Viewing Statistics by Teacher in the Training plus Coaching Group

Center ID	Teacher ID	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Score High/Low	
3	8	V ⁴	V ³	V ²	V ⁴	V ⁶	V ⁴	V ²	-	10	
		-	ER	-	-	-	ER	-	ER	High	
	10	V ²	V ¹	V ¹	V ¹	V ⁷	V ²	V ¹	NA	13	
		ER	ER	ER	-	ER	ER	ER		High	
12	-	V ⁴	-	-	V ¹	-	V ¹	-	-	3	
		-	-	-	-	-	-	-	-	Low	
9	x	x	x	x	x	x	x	-	x	0	
		-	-	-	-	-	-	-	-	Low	
2	6	V ^{19*}	V ⁴	V ⁴	-	-	-	-	NA	8	
		-	ER	-	ER	ER	ER	ER		High	
	7	-	-	-	-	-	-	-	NA	NA	0
-			-	-	-	-	-	-		Low	
15	-	-	-	-	-	-	NA	NA	NA	0	
		-	-	-	-	-	-			Low	
5	16	V ⁴	V ²	V ¹	-	-	NA	NA	NA	5	
		ER	-	ER	-	-				Low	
	17	-	-	-	-	-	-	-	NA	NA	0
			-	-	-	-	-	-			Low
	19	-	V ⁷	V ¹	V ⁴	V ¹	V ¹	NA	NA	NA	5
			-	-	-	-	-				Low
20	-	V ¹	-	-	-	NA	NA	NA	NA	1	
		-	-	-	-					Low	
21	-	V ¹	V ¹	V ¹	V ¹	NA	NA	NA	NA	4	
		-	-	-	-					Low	
30	-	V ⁷	-	V ¹	V ³	-	NA	NA	NA	7	
		ER	ER	ER	ER	-				High	

	31	V ¹ -	V ² -	V ⁶ -	- -	- -	- -	NA	NA	3 Low
8	28	V ³ -	- -	V ¹ -	- -	- -	- -	-	NA	2 Low
	33	- ER	V ¹ -	V ¹ ER	V ¹ -	V ¹ ER	- -	-	NA	7 High

Note. V= video viewed. Superscript indicates number of times video was viewed. ER=Email reply was received. Dash indicates video or email was available, but it was not viewed or no reply was received. NA indicates no filming took place. X = Special situation with one teacher. She had only one child who was allowed to be filmed, and he was absent each week. We filmed the one day the child was present. *= The video was viewed 16 times in one day. This indicates a technical problem loading video. The video was also accessed on 3 additional days across 3 weeks.

Table 7

Differential Participation in Coaching by Teacher

Teacher ID	Number Sessions	% Videos Viewed	% Emails Responses	High or Low Participation (High = 7+)
8*+	8	87.5% (n=7)	37.5% (n=3)	High
10*+	7	100% (n=7)	85.71% (n=6)	High
12+	8	37.5% (n=3)	0	Low
9	1	0	0	Low
6+	7	42.86% (n=3)	71.43% (n=7)	High
7	6	0	0	Low
15+	5	0	40% (n=2)	Low
16	5	60% (n=3)	40% (n=2)	Low
17	6	0	0	Low
19	5	100% (n=5)	0	Low
20	4	25% (n=1)	0	Low
21	4	100% (n=4)	0	Low
30+	5	60% (n=3)	80% (n=4)	High
31+	6	50% (n=3)	0	Low
28	7	28.57% (n=2)	0	Low
33+	7	57.14% (n=4)	42.86% (n=3)	High

Note. Highlighted or non-highlighted blocks of participants are from the same center. * indicates teacher participated in a previous study with the investigator. + indicates teacher received additional materials.

To explore the effects of differential exposure to the coaching intervention, a variable was created to reflect how frequently teachers accessed the coaching website. Each teacher in the

condition was assigned a score based on the number of videos viewed and email responses sent. A score of one was given each time a teacher viewed a video or sent an email response to the investigator. For example, a teacher who viewed one video and replied to one email received a score of 2. A teacher who viewed five videos but did not reply to any emails received a score of 5. Based on these scores, teachers in the training plus coaching group were categorized in two groups: high participation (score of 7 or more points) or low participation (score of 6 or less points). The distinction between high participation and low participation was based on the average number of opportunities to view a video or receive email feedback. The average number of coaching sessions across all teachers in the training plus coaching group was six. No teachers earned a score of 6, so a score of 7 was set as the threshold for high participation. Teachers who earned a score of 7 accessed, on average, one more than half of their coaching session videos or emails. To analyze the difference in outcomes between high-participants, low-participants, and the training only group, a categorical variable, Participation, was created with 2 = high participation ($n = 5$), 1 = low participation ($n = 11$), and 0 = training only group ($n = 17$). Descriptive information about the teachers in each group are shown in Table 8.

Table 8

Characteristics of Teachers in Training Only, Low, and High Participation Groups

		Training Only	Low Participation	High Participation
N		17	11	5
Level of Education Completed	H.S.	17.65%	9.09%	40%
	Associates	52.94%	45.45%	40%
	Bachelors	29.41%	27.27%	20%
	Masters	0	18.18%	0
Race or Ethnicity	African American	23.53%	27.27%	20%
	Hispanic	0	9.09%	0
	White	76.47%	63.63%	80%
Age	18-29	23.53%	18.18%	20%
	30-39	5.88%	54.54%	20%
	40-49	35.29%	9.09%	40%
	50-59	35.29%	9.09%	20%
	60+	0	9.09%	0
Yrs Experience		9.63	14.95	11.38
% IEP		8.33%	10.02%	7.11%
% ELL		10.83%	16.83%	4.59%
High-speed		.	18.18%	40%
Personal Email		.	9.09%	80%
Requested Materials		.	27.27%	100%

CHAPTER III

RESULTS

Results are presented sequentially, beginning with fidelity of implementation of the professional development intervention and ending with social validity analyses. First, procedural fidelity on training and coaching procedures (independent variable) is described. Second, interobserver agreement data are presented for each dependent measure. Third, group equivalence on all dependent measures at Wave 1 (baseline) is presented to demonstrate outcomes from the randomization procedures. Fourth, the effects of the professional development intervention on dependent measures are presented for classroom measures and then for child-level measures. Each outcome is discussed relative to (a) the statistical analysis used, (b) assumptions relevant to the inferential statistical test used, (c) results of the analysis, and (d) results of ancillary analyses. Ancillary analyses include data on teachers' differential exposure to the coaching intervention. Finally, social validity data are presented.

Procedural Fidelity Related to the Professional Development Intervention

Workshop training. Overall, fidelity to the training protocol was high ($M = 98.44\%$; range: 96.88% - 100%). The only deviation from the protocol occurred during training for Cohort 2, when the presenter eliminated one introductory video describing social-emotional teaching strategies due to technical difficulties at the training site. The training began later than anticipated, and the 22-min video was eliminated to save time.

Action plans. All action plans were assessed for fidelity to a 7-step protocol (see Appendix E). The action plans created during Cohort 1's training did not meet fidelity standards

($M = 43.81\%$; range: 14.29% - 85.71%), so the investigator scheduled a brief after-school meeting at each center. During this meeting, teachers reviewed their action plans and rewrote the plans to include all necessary elements. The investigator supported this process by providing models and offering suggestions as needed. The revised action plans were coded for fidelity to the protocol and met fidelity standards ($M = 93.33\%$; range: 71.43% - 100%). The action plans created during Cohort 2's training met fidelity standards ($M = 92.44\%$, range: 71.43% - 100%), so no additional action planning meetings were conducted. One action plan in Cohort 2 was not assessed for fidelity because the teacher did not turn it in for photocopying at the training, so this analysis was conducted with 32 action plans. Univariate ANOVA was used to test for between-group differences and cohort effects. There was no statistically significant difference between treatment groups, $F(1, 32) = .71, p = .41$, or cohorts, $F(1, 32) = .04, p = .85$.

Email feedback. Average fidelity to the email protocol was 99.03% (range: 77.78% - 100%). Across both cohorts, 57 emails were sent (see Tables 6 and 7). Across teachers and cohorts, one email fell below the fidelity criterion of 80% and three emails had 88.89% fidelity to the protocol. The remaining emails included each component (100%) of the email fidelity protocol. Each week's coaching session consisted of an email feedback message and a video. Part of the 5-step email protocol included offering a link to the weekly video clip from each teacher's classroom. There were no emails sent without a video link, and there were no videos posted without an email message. On average, teachers received six emails with embedded video links (range: 1 – 8). Most teachers ($n = 9$) received at least six emails, and all teachers except one received at least four emails. The one with the lowest value was due to a lack of child consents for filming. The parents of 11 children in this class provided consent for SSIS forms to be completed, but only one parent consented to videotaping. The child had poor attendance and was

only present on one filming day. During the first week of coaching, the investigator initiated a conversation with this teacher about her continued participation in the study. She reminded the teacher that participation was voluntary, described the prorated stipend she would receive if she left the study early, and gained verbal consent to continue with the study (observational measures, SSIS data collection, and potential videotaping) in her classroom.

Interobserver Agreement for Primary Dependent Measures

Teaching Pyramid Observation Tool (TPOT). IOA was assessed on 29% of TPOT observations (38 of 131). Agreement was assessed at least once per wave per treatment group. Average IOA across waves and treatment conditions was 81.89% (67.18% - 97.79%). Mean IOA (with standard deviations in parentheses) for Waves 1 through 4 were 82.44% (6.26), 78.92% (6.46), 84.19% (6.04), and 83.59% (4.67), respectively. IOA statistics by wave and treatment group are shown in Table 9.

Table 9

Interobserver Agreement on the Teaching Pyramid Observation Tool

		Wave 1 <i>M (SD)</i> (Min, Max)	Wave 2 <i>M (SD)</i> (Min, Max)	Wave 3 <i>M (SD)</i> (Min, Max)	Wave 4 <i>M (SD)</i> (Min, Max)	Grand Total <i>M</i> (<i>SD</i>)
Training Only	C1 (<i>n</i> =8)	85.25 (8.49) (75.57, 93.89)	80.41 (2.89) (77.09, 82.44)	86.26 (2.16) (84.73, 87.8)	82.82 (1.62) (81.68, 83.97)	
	C2 (<i>n</i> =8)	78.63 (0) (78.63)	78.63 (11.09) (67.18, 89.31)	76.34 (0) (76.34)	81.68 (1.08) (80.92, 82.44)	
	Total (<i>n</i> =16)	81.53 (7.53)	79.52 (7.31)	82.95 (5.93)	82.25 (1.30)	81.26 (5.94)
Training plus Coaching	C1 (<i>n</i> =7)	79.39 (0) (79.39)	74.05 (6.48) (69.47, 81.67)	89.91 (10.55) (82.44, 97.4)	85.11 (11.34) (77.09, 93.13)	
	C2 (<i>n</i> =9)	86.26 (2.16) (84.73, 97.79)	80.15 (5.79) (74.05, 87.02)	82.25 (2.88) (78.63, 81.7)	84.73 (2.16) (83.21, 86.26)	
	Total (<i>n</i> =16)	83.97 (4.25)	78.41 (6.18)	84.80 (6.55)	84.92 (6.67)	82.46 (6.46)
Grand Total	82.44 (6.26)	78.92 (6.46)	84.19 (6.04)	83.59 (4.67)	81.89 (6.17)	

Note. C1 = Cohort 1, C2 = Cohort 2, and Total = pooled across cohorts.

Classroom Assessment Scoring System (CLASS). IOA was assessed for 27% of CLASS sessions (18 of 66). Agreement was assessed at least once per wave in each treatment group. Average IOA across waves and treatment groups was 87.36% (72.5% - 100%). Mean IOA (with standard deviations in parentheses) for Waves 1 and 4 were 86.88% (8.10) and 87.75% (12.84), respectively. Average IOA statistics across treatment groups and waves are shown in Table 10.

Table 10

Interobserver Agreement on the Classroom Assessment Scoring System

		Wave 1 <i>M (SD)</i> (Min, Max)	Wave 4 <i>M (SD)</i> (Min, Max)	Grand Total <i>M (SD)</i>
Training Only	C1	97.50	78.75 (8.84) (72.5, 85)	
	C2	-	86.25 (12.37) (77.5, 95)	
		97.50	82.5 (9.79) (72.5, 85)	88.75 (9.24) (72.5, 95)
Training plus Coaching	C1	88.33 (16.27) (80, 97.5)	91.67 (12.33) (77.5, 100)	
	C2	83.13 (6.57) (77.5, 92.5)	90.83 (7.64) (82.5, 97.5)	
	Total	85.36 (7.42) (77.5, 97.5)	91.25 (9.19) (77.5, 100)	88.08 (8.49) (77.5, 100)
Grand Total		86.88 (8.10) (77.5, 97.5)	87.75 (12.84) (77.5, 100)	87.36 (8.93) (72.5, 100)

Note. Note. C1 = Cohort 1, C2 = Cohort 2, and Total = pooled across cohorts. Dash indicates interobserver agreement was not assessed in a treatment condition/cohort/wave.

Classwide challenging behavior. IOA was assessed for 29% of observations (38 of 131). Agreement was assessed at least once per wave in each treatment group. Average IOA on classwide challenging behavior across waves and treatment groups was 94.14% (79.41% - 100%). Mean IOA (with standard deviations in parentheses) for Wave 1 through Wave 4 were 92.50% (7.58), 92.79% (6.81), 94.49% (4.49), and 95.88% (5.13), respectively. IOA statistics for overall classwide challenging behavior are shown in Table 11; Occurrence and nonoccurrence agreement for low intensity and high intensity behaviors across waves and treatment groups are shown in Table 12.

Table 11

Interobserver Agreement on Measures of Classwide Challenging Behavior

		Wave 1 <i>M (SD)</i> (Min, Max)	Wave 2 <i>M (SD)</i> (Min, Max)	Wave 3 <i>M (SD)</i> (Min, Max)	Wave 4 <i>M (SD)</i> (Min, Max)	Grand Total <i>M (SD)</i> (Min, Max)
Training Only	C1	92.57 (8.95) (80, 100)	89.34 (4.65) (84.13, 96.36)	93.02 (5.17) (89.36, 96.67)	96.72 (2.04) (94.43, 93.33)	
	C2	81.55	98.38 (1.93) (96.24, 100)	100	97.2 (3.96) (94.40, 100)	
	Total	90.37 (9.19) (80, 100)	93.86 (5.88) (84.13, 100)	95.34 (5.44) (89.36, 100)	96.91 (2.46) (94.40, 100)	94.12 (2.79) (80, 100)
Training plus Coaching	C1	97.28	96.36	93.56 (4.59) (90.31, 96.81)	97.50 (1.17) (94.67, 98.33)	
	C2	95.46 (1.11) (94.67, 96.24)	92.09 (9.55) (79.41, 100)	95.02 (5.34) (89.38, 100)	91.67 (11.79) (83.33, 100)	
	Total	96.06 (1.31) (94.67, 96.24)	92.95 (8.49) (79.41, 100)	94.44 (4.49) (89.38, 100)	94.58 (7.62) (83.33, 100)	93.03 (6.69) (79.41, 100)
Grand Total	92.50 (7.58) (80, 100)	92.79 (6.81) (79.41, 100)	94.49 (4.49) (89.38, 100)	95.88 (5.13) (83.33, 100)	94.14 (6.04) (79.41, 100)	

Table 12

Percentage Occurrence and Nonoccurrence Interobserver Agreement for Measures of Classwide Challenging Behavior

		<i>M</i>	<i>SD</i>	Min	Max
Training Only	Occurrence Agreement Low Intensity	49.93	33.98	14.29	100
	Occurrence Agreement High Intensity	32.92	43.19	0	100
	Nonoccurrence Agreement Low Intensity	92.99	6.59	80.53	100
	Nonoccurrence Agreement High Intensity	96.32	5.21	81.63	100
Training plus Coaching	Occurrence Agreement: Low Intensity	41.97	31.51	0	100
	Occurrence Agreement High Intensity	55.35	40.51	0	100
	Nonoccurrence Agreement Low Intensity	95.20	4.09	88.27	100
	Nonoccurrence Agreement High Intensity	96.74	3.89	88.51	100

Evaluation of Group Equivalence Prior to Intervention

One-way ANOVA was used to test the equivalence of treatment groups and cohorts on all measures at Wave 1 (pre-intervention). These analyses were conducted to ensure that experimental effects could be attributed to treatment rather than differences across groups. There were no statistically significant variations across treatment groups on the Wave 1 TPOT, $F(1, 30) = 0.01, p = .89$; the Wave 1 composite CLASS, $F(1, 31) = 0.14, p = .72$; or Wave 1 classwide challenging behavior, $F(1, 30) = 0.17, p = .69$. There were also no statistically significant differences between cohorts on the Wave 1 TPOT, $F(1, 30) = 0.17, p = .68$; the Wave 1 CLASS, $F(1, 31) = 0.001, p = .96$; or the Wave 1 classwide challenging behavior, $F(1, 30) = 1.14, p = .29$. There were, however, statistically significant differences between cohorts on the Instructional Support domain of the CLASS, $F(1, 31) = 9.04, p < .001$. Post-hoc *t*-tests indicated that Cohort 1 had higher scores at Wave 1, 95% CI [0.16 - 0.81]. It is hypothesized that this difference is due to cohort effects related to the time of the year in which data were collected. Data for Cohort 1 were collected in January; data for Cohort 2 were collected in September of the following school year. This difference might reflect the increased complexity of instructional content over the course of the school year and the slightly older age of the children. Because data were pooled across cohorts, and there were no statistically significant differences between treatment groups, no adjustments were made to the analysis to account for cohort effects on the CLASS instructional support domain.

Center Profile

The center profile (see Appendix G) was a descriptive measure of access to technology, staff cohesion, and professional development resources at each center. Average scores for the

five subscales of the profile (Technology, Staff Skill, Training, Staff Cohesion, and Professional Demands) are shown in Table 13. One-way ANOVA was used to examine differences between treatment groups and cohorts. The measure was scored on a 5-point scale. Negatively rated items were reverse-coded. Scores were obtained by summing the ratings for all items (after reverse coding) and dividing by the total number of items. The average score for centers in the training only group was 3.4 ($SD = 0.22$; range 3.22 -3.74). The average score for centers in the distance coaching group was 3.32 ($SD = 0.20$; range 3.04 – 3.48). The difference in means was not statistically significant, $F(1, 8) = 0.49, p = .51$. There were no statistically significant differences between cohorts, $F(1,8) = 0.86, p = .38$. The average score was 3.44 ($SD = 0.29$; range 3.04 – 3.74) for Cohort 1 and 3.31 ($SD = 0.09$; range 3.22 – 3.48) for Cohort 2.

Table 13

Center Profile Results by Cohort and Treatment Group

	Training Only			Training plus Coaching			<i>F</i>	<i>p</i>
	C1 <i>M</i> (<i>SD</i>)	C2 <i>M</i> (<i>SD</i>)	Total <i>M</i> (<i>SD</i>)	C1 <i>M</i> (<i>SD</i>)	C2 <i>M</i> (<i>SD</i>)	Total <i>M</i> (<i>SD</i>)		
Technology	2.86 (.45)	2.74 (.16)	2.79 (.26)	2.68 (.06)	2.68 (.06)	2.68 (.05)	0.62	.46
Staff Skill	4.17 (.24)	3.61 (.42)	3.83 (.44)	3.83 (.24)	3.67 (.24)	3.75 (.22)	0.12	.74
Training	4.75 (0)	4.42 (.38)	4.50 (.33)	3.75 (0)	4.25 (.71)	4.00 (.50)	4.01	.09
Staff Community	3.91 (0)	3.64 (.31)	3.75 (.27)	3.36 (.39)	3.54 (.13)	3.45 (.26)	2.71	.14
Management	3.46 (.05)	3.05 (.22)	3.21 (.28)	3.21 (.51)	3.43 (.10)	3.32 (.32)	0.29	.61
Total Score	3.63 (.15)	3.27 (.05)	3.41 (.22)	3.25 (.29)	3.38 (.14)	3.32 (.20)	0.49	.51

Note. C1= Cohort 1; C2= Cohort 2; Total = Pooled across cohorts. Items were rated on a scale of 1 – 5. Anova $F(1, 8)$. No significant *p*- values at $p < .05$.

Relation between Implementation of Intervention and TPOT Scores

A repeated measures ANOVA with one within-subject factor (time) and one between-subject factor (condition) was conducted to evaluate relationships between implementation of the professional development intervention and TPOT scores. Mean TPOT scores across time and treatment groups are shown in Tables 14 through 17. Data are illustrated separately for raw TPOT scores ($v = 108$; Table 14), environmental Items ($v = 7$; Table 15), red Flags ($v = 16$; Table 16), and the item on responding to problem behavior ($v = 10$; Table 17).

Table 14

Raw TPOT Score by Treatment Group and Cohort

		Time 1	Time 2	Time 3	Time 4
		<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>
		(<i>SD</i>)	(<i>SD</i>)	(<i>SD</i>)	(<i>SD</i>)
Training Only	C1 (<i>n</i> =8)	43 (15.63)	44.38 (11.56)	42 (16.42)	40.63 (12.77)
	C2 (<i>n</i> =8)	41.25 (13.29)	42.5 (13.78)	42.63 (13.38)	42.63 (16.38)
	Total (<i>n</i> =16)	42.13 (14.05)	43.44 (12.33)	42.31 (14.48)	41.63 (14.23)
Training plus Coaching	C1 (<i>n</i> =7)	44 (11.55)	44.14 (12.13)	44 (12.61)	44.43 (14.72)
	C2 (<i>n</i> =9)	41.78 (13.45)	38.33 (7.94)	44.89 (11.23)	38.56 (8.75)
	Total (<i>n</i> =16)	42.75 (12.29)	40.88 (10.07)	44.5 (11.45)	41.13 (11.68)

Note. C1= Cohort 1; C2= Cohort 2; Total = Data pooled across cohorts. Raw TPOT has maximum score of 108.

Table 15

TPOT Environment Subscale by Treatment Group

		Time 1	Time 2	Time 3	Time 4
		<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>
		(<i>SD</i>)	(<i>SD</i>)	(<i>SD</i>)	(<i>SD</i>)
Training Only	C1 (<i>n</i> =8)	6.25 (0.96)	6 (0.82)	6.25 (0.96)	6.25 (0.96)
	C2 (<i>n</i> =8)	6.5 (1)	6 (1.41)	5.5 (1.92)	6 (0.82)
	Total (<i>n</i> =16)	6.38 (0.92)	6 (1.07)	5.88 (1.46)	6.13 (0.84)
Training plus Coaching	C1 (<i>n</i> =7)	6 (1)	7 (0)	7 (0)	7 (0)
	C2 (<i>n</i> =9)	6.4 (0.89)	6.4 (0.55)	6.4 (0.55)	6.2 (0.84)
	Total (<i>n</i> =16)	6.25 (0.87)	6.63 (0.52)	6.63 (0.52)	6.5 (0.76)

Note. C1= Cohort 1; C2= Cohort 2; Total = Data pooled across cohorts. Subscale maximum score is 7.

Table 16

TPOT Red Flags by Treatment Group

		Time 1	Time 2	Time 3	Time 4
		<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>
		(<i>SD</i>)	(<i>SD</i>)	(<i>SD</i>)	(<i>SD</i>)
Training Only	C1 (<i>n</i> =8)	3 (2.39)	3.5 (1.31)	2.75 (1.39)	3 (2)
	C2 (<i>n</i> =8)	1.75 (1.17)	1.88 (1.89)	1.13 (.84)	1 (1.19)
	Total (<i>n</i> =16)	2.38 (1.93)	2.69 (1.78)	1.94 (1.39)	2 (1.89)
Training plus Coaching	C1 (<i>n</i> =7)	2.43 (1.27)	2 (1.53)	2.43 (2.64)	2.43 (1.51)
	C2 (<i>n</i> =9)	1 (1.67)	2.56 (1.94)	1.44 (1.59)	1.78 (1.3)
	Total (<i>n</i> =16)	2 (1.27)	2.31 (1.74)	1.87 (2.09)	2.06 (1.39)

Note. C1= Cohort 1; C2= Cohort 2; Total = Data pooled across cohorts. Subscale maximum score is 16. Item is scored negatively, so lower scores indicate fewer Red Flags.

Table 17

TPOT Challenging Behavior Item by Treatment Group

			Time 1	Time 2	Time 3	Time 4
Training Only	C1 (n=8)	No. times Scored	5	8	6	7
		<i>M (SD)</i> of Scored	4 (2.74)	4.75 (2.96)	4.83 (2.04)	3.5 (3.39)
	C2 (n=8)	No. times Scored	8	5	6	5
		<i>M (SD)</i> of Scored	4.13 (2.78)	5.8 (1.79)	4.83 (2.48)	2.6 (3.42)
	Total (n=16)	No. times Scored	13	13	12	12
		<i>M (SD)</i> of Scored	4.08 (2.63)	5.15 (2.44)	4.83 (2.17)	3.09 (2.59)
Training plus Coaching	C1 (n=7)	No. times Scored	3	4	3	4
		<i>M (SD)</i> of Scored	3.67 (1.15)	6 (2.58)	7.33 (2.31)	4 (5.47)
	C2 (n=9)	No. times Scored	6	7	4	6
		<i>M (SD)</i> of Scored	3.5 (1.97)	3 (2.49)	4.75 (2.63)	2.8 (2.49)
	Total (n=16)	No. times Scored	9	11	7	10
		<i>M (SD)</i> of Scored	3.56 (1.67)	4.09 (2.81)	5.86 (2.67)	3.4 (4.06)

Note. C1= Cohort 1; C2= Cohort 2; Total = Data pooled across cohorts. Item maximum score is 10.

Exploratory analysis. Tests appropriate for evaluating whether TPOT data met the assumptions for repeated measures ANOVA were conducted (i.e., normality, sphericity, and homogeneity of variance and covariance). Descriptive statistics, box plots, and stem-and-leaf plots were analyzed for each measurement occasion and condition. Skewness and kurtosis statistics were within acceptable boundaries (-1 to +1) for the TPOT and associated subscales. Plots indicated roughly normal distributions across time and conditions. Mauchly's test of sphericity was used to test the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables was proportional to an identity matrix. Mauchly's test indicated the assumption of sphericity had not been violated, $\chi^2(5) = .74, p = .129$. Box's test of equality of covariance matrices was used to assess the assumption of homoscedasticity. Box's M was statistically significant for the raw TPOT score ($M = 2.23, p = .03$) indicating the covariance matrices were not equal. Box's M is sensitive to minor departures from normality in the sample. Because *F*-tests are relatively robust to minor violations and all other TPOT subscales did not violate this assumption, the statistically significant Box's M was interpreted with caution. Levene's test for each measurement occasion were not statistically significant (Time 1, $F(1, 30) = 0.09, p = .75$; Time 2, $F(1, 30) = 2.00, p = .16$; Time 3, $F(1, 30) = 0.49, p = .48$; Time 4, $F(1, 30) = 0.13, p = .71$) indicating that the assumption of equal error variance was not violated. There was one missed TPOT observation during Wave 1 of Cohort 2. Analyses were conducted with 32 data sets of four observations each.

Main effects. With respect to the substantive hypothesis, there was no statistically significant effect associated with implementation of the professional development intervention and TPOT scores for time, $F(3, 90) = 0.37, p = .78$; experimental condition, $F(1, 30) = 0.0001, p = .99$; or the interaction between time and experimental condition, $F(3, 90) = 0.523, p = .67$,

$\eta_p^2 = 0.012$ on raw TPOT scores. On the environmental items, there was no statistically significant effect for time, $F(3, 90) = 1.12, p = .35, \eta_p^2 = 0.04$; experimental condition, $F(1, 30) = .70, p = .41, \eta_p^2 = 0.02$; or the interaction between time and experimental condition, $F(3, 90) = 1.36, p = .26, \eta_p^2 = 0.04$. For red flags, there were no significant effects for time, $F(3, 90) = 1.17, p = .33, \eta_p^2 = 0.04$; experimental condition, $F(3, 90) = 0.18, p = .68, \eta_p^2 = 0.01$; or the interaction between time and experimental condition, $F(3, 90) = 1.17, p = .88, \eta_p^2 = 0.007$. Finally, there were no statistically significant effects on responding to problem behavior for time, $F(3, 90) = 0.81, p = .49, \eta_p^2 = 0.03$; experimental condition, $F(1, 30) = 1.31, p = .26, \eta_p^2 = 0.04$; or the interaction between time and experimental condition, $F(3, 90) = 0.32, p = .81, \eta_p^2 = 0.01$. Effect sizes were very small ($\eta_p^2 = 0.01 - 0.04$).

Based on power analyses conducted prior to beginning the study, a sample size of at least 18 teachers should have provided sufficient power to detect an effect size of .8 at alpha = .05. Although 33 teachers were enrolled in the study, the obtained effect sizes were smaller than the predicted effect size. The study had insufficient power to detect such small effect sizes.

Although results of the statistical analyses showed no statistically significant interaction effects, it was hypothesized that coaching may have had differential effects on a subset of TPOT items and indicators. Although coaching was individualized to meet the needs of each teacher, several topics were addressed across all teachers in the distance coaching group. The TPOT items associated with these topics were included in an abbreviated Coaching TPOT: Supportive Conversations, Promoting Engagement, Providing Directions, Teaching Social Skills and Emotional Competencies, Teaching Children to Express Emotions, Teaching Problem Solving, and Promoting Friendship Skills. There were 61 indicators across these seven items. Teachers' scores on each of these indicators were totaled, and the sum was divided by 61 and multiplied by

100 to obtain a percent of coached indicators teachers were implementing at each data collection wave. Percent of coached indicators are shown in Table 18 for teachers across waves and treatment groups. Based on previous *Teaching Pyramid* research (Hemmeter, Snyder, & Fox, 2009; in progress), these items were not expected to change without systematic support. Although there was a promising increase in percent of coached indicators during Wave 3 for teachers in the coaching group, the interaction between time and treatment group was not statistically significant or noteworthy, $F(3, 90) = 0.53, p = .67, \eta_p^2 = 0.02$. Similarly, there was no statistically significant or noteworthy effect for time, $F(3, 90) = 1.6, p = .19, \eta_p^2 = 0.05$, or experimental condition, $F(1, 30) = 0.003, p = .96, \eta_p^2 = .001$.

Table 18

Percent of Indicators on Abbreviated Coaching TPOT by Treatment Group and Cohort

		Time 1	Time 2	Time 3	Time 4
		<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>
		(<i>SD</i>)	(<i>SD</i>)	(<i>SD</i>)	(<i>SD</i>)
Training Only	C1 (<i>n</i> =8)	39.58 (15.60)	42.92 (11.19)	41.46 (15.82)	35.84 (14.91)
	C2 (<i>n</i> =8)	40.21 (13.67)	46.04 (14.83)	42.29 (16.86)	42.29 (18.43)
	Total (<i>n</i> =16)	39.89 (14.17)	44.48 (12.79)	41.88 (15.79)	39.06 (16.53)
Training plus Coaching	C1 (<i>n</i> =7)	43.81 (11.13)	39.76 (10.11)	41.67 (16.75)	41.91 (13.89)
	C2 (<i>n</i> =9)	39.01 (11.46)	42.41 (11.58)	44.63 (16.33)	36.11 (10.57)
	Total (<i>n</i> =16)	41.15 (11.20)	41.25 (10.69)	43.33 (16.02)	38.65 (12.07)

Note. C1= Cohort 1; C2= Cohort 2; Total = Data pooled across cohorts. Abbreviated Coaching TPOT has maximum score of 61.

Relationship between Implementation of Professional Development Intervention and Classroom Climate

A repeated measures MANOVA was conducted to evaluate the effects of coaching on the three domains of the CLASS: Emotional Support, Classroom Organization, and Instructional Support. Mean scores for each of these domains, and the 10 dimensions comprising them, are shown in Table 19. MANOVA was chosen because it allowed us to evaluate three interrelated constructs of “classroom quality” measured by the CLASS in a single analysis.

Table 19

CLASS Dimension and Domain Scores by Treatment Group

		Training Only		Training + Coaching	
		Pre-	Post	Pre-	Post
Emotional Support	Positive Climate	5.31	4.88	5.00	5.06
	Negative Climate	1.32	1.58	1.19	1.14
	Teacher Sensitivity	4.44	4.30	4.34	4.32
	Regard for Student Perspectives	4.37	4.5	4.17	4.14
	Total Domain Score	5.19	5.03	5.08	5.09
Classroom Organization	Behavior Management	4.75	4.5	4.56	4.88
	Productivity	5.15	4.83	4.56	4.80
	Instructional Learning Format	3.69	2.97	3.43	3.17
	Total Domain Score	4.53	4.10	4.19	4.28
Instructional Support	Concept Development	1.31	1.38	1.7	1.45
	Quality of Feedback	1.58	1.66	1.88	1.86
	Language Modeling	2.38	2.39	2.55	2.17
	Total Domain Score	1.76	1.81	2.04	1.83

Note. All dimensions are scored on a scale of 1 – 7, with 7 corresponding to higher classroom quality. Negative Climate is scored negatively, so lower scores are desirable. To calculate the domain score for Emotional Support, Negative Climate was reverse coded.

Exploratory analyses. The data were analyzed to ensure they conformed to all relevant assumptions. Skewness and kurtosis statistics were within acceptable boundaries. Histograms and stem-and-leaf plots confirmed the assumption of normality for all variables and conditions. Box's M was not statistically significant, $M = 14.81$, $p = .95$, and Levene's test had no statistically significant results. Because the CLASS was only administered twice, the assumption of sphericity was not violated.

Main effects. There was no statistically significant or noteworthy effect for time on the multivariate analysis of Emotional Support, Classroom Organization, and Instructional Support, Wilks' $\Lambda = 0.95$, $F(3, 29) = 0.52$, $p = .67$, $\eta_p^2 = .05$. Observed power was 0.14. There was no statistically significant or noteworthy main effect for experimental condition, Wilks' $\Lambda = 0.95$, $F(3, 29) = 0.47$, $p = .7$, $\eta_p^2 = 0.05$. However, the interaction between time and experimental condition was statistically significant, although the effect size was small, Wilk's $\Lambda = 0.77$, $F(3, 29) = 2.92$, $p = .05$, $\eta_p^2 = 0.23$. Means for each domain by time and condition are shown in Table 19. Examining these means, it appears classrooms in the training only group declined in two domains (Emotional Support and Classroom Organization) while the training plus coaching group improved slightly. The opposite effect was noted for Instructional Support; the training only group increased slightly while the training plus coaching group decreased at Wave 4. Observed power for the MANOVA was .63. All CLASS a priori power analyses were set at .8, and alpha was set at .05. The post-hoc power analyses indicate the study might be underpowered to reject the null hypothesis. Associations between experimental condition and CLASS scores showed a therapeutic trend for four CLASS dimensions: Behavior Management, Productivity, Positive Climate, and Negative Climate. The associations were very small and not statistically significant.

Relation between Implementation of the Professional Development Intervention and Classwide Challenging Behavior

A repeated measures ANOVA with one within-subject factor (time) and one between-subject factor (condition) was conducted. Main effects for time, condition, and the interaction (time X condition) were evaluated. The average percentage of intervals with classwide challenging behavior for each wave and condition are shown in Table 20. Incidences of high and low intensity behavior are shown in Table 21.

Table 20

Total Classwide Challenging Behavior by Treatment Group and Cohort

		Time 1	Time 2	Time 3	Time 4
Training Only	C1	6.94 (6.88)	14.71 (10.15)	10.22 (5.85)	6.29 (6.14)
	C2	6.90 (11.18)	4.88 (1.94)	5.97 (8.87)	3.67 (5.36)
	Total	6.92 (8.96)	9.80 (8.69)	8.09 (7.58)	4.98 (5.73)
Training plus Coaching	C1	3.81 (3.96)	3.45 (2.89)	4.48 (6.63)	3.01 (3.87)
	C2	12.28 (17.26)	7.59 (8.13)	8.89 (12.07)	5.67 (8.24)
	Total	8.57 (13.57)	5.78 (6.57)	6.96 (10.02)	4.51 (6.64)

Note. C1= Cohort 1; C2= Cohort 2; Total = Data pooled across cohorts

Table 21

Low and High Intensity Classwide Challenging Behavior by Treatment Group and Cohort

		Time 1		Time 2		Time 3		Time 4	
		Low	High	Low	High	Low	High	Low	High
Training Only	C1	3.96 (4.27)	2.99 (4.62)	12.22 (10.18)	2.49 (2.22)	7.22 (3.00)	2.99 (6.44)	4.82 (4.49)	1.47 (2.01)
	C2	5.10 (9.89)	1.81 (2.31)	3.99 (1.69)	.89 (.89)	3.13 (3.56)	2.85 (6.12)	1.94 (3.58)	1.73 (2.13)
	Total	4.52 (7.39)	2.40 (3.58)	8.11 (8.23)	1.69 (1.83)	5.17 (3.82)	2.92 (6.07)	3.38 (4.19)	1.60 (2.00)
Training plus Coaching	C1	3.65 (3.68)	.16 (.42)	2.98 (2.80)	.48 (.87)	3.13 (3.50)	1.35 (3.33)	2.46 (3.31)	.48 (.82)
	C2	8.27 (11.16)	4.01 (7.77)	3.70 (4.30)	3.89 (5.56)	5.06 (6.78)	3.83 (10.47)	3.94 (6.98)	1.73 (3.53)
	Total	6.25 (8.80)	2.32 (6.01)	3.39 (3.62)	2.39 (4.46)	4.22 (5.52)	2.74 (8.03)	3.29 (5.57)	1.18 (2.71)

Note. C1= Cohort 1; C2= Cohort 2; Total = Data pooled across cohorts

Exploratory analyses. The data were evaluated to determine whether the assumptions of ANOVA were met. Skewness and kurtosis statistics, box plots, and stem-and-leaf plots were analyzed to assess normality. The skewness statistics were higher than recommended for the training only and training plus coaching groups, respectively (Time 1 = 1.96 and 2.35; Time 2 = 1.49 and 1.14; Time 3 = 1.11 and 1.93; Time 4 = 1.75 and 1.56). The kurtosis statistics were also high (Time 1 = 4.29 and 5.26; Time 2 = 1.29 and .18; Time 3 = 1.00 and 3.58; Time 4 = 2.64 and 1.50) indicating a violation of normality. Histograms and stem-and-leaf plots revealed the data were positively skewed. Because each wave and condition followed the same pattern and the violations did not appear severe, no data transformations were conducted. Mauchly's test indicated the assumption of sphericity had been violated, $\chi^2(5) = 35.83, p = .0001$. Violating sphericity increased Type I error rates. The Huynh-Feldt correction accounts for this violation by using non-pooled error variance terms and adjusting the degrees of freedom.

Main effects. Using the Huynh-Feldt correction, there were no statistically significant effects for time, $F(3, 90) = 1.18, p = .32, \eta_p^2 = 0.04$. There were no main effects for experimental condition, $F(1, 30) = 0.24, p = .63, \eta_p^2 = 0.008$. The interaction between time and experimental condition on classwide challenging behavior was not statistically significant or noteworthy, $F(1.99, 59.6) = 0.74, p = .48, \eta_p^2 = 0.02$.

Relation between Participation in Intervention and Classroom Outcomes

As described previously, teachers in the training plus coaching group accessed the web-mediated coaching resources differentially. Data were collected on teachers' website activity. The website created a report recording each time a teacher viewed a video. A log was also kept of whether a teacher replied to an email. This served as an indicator that teachers had received

and read the email. Teachers' viewing and email habits varied greatly. Data on when and how often teachers viewed videos and replied to emails are shown in Table 6.

At the end of the study, each teacher had been sent between one and eight emails with embedded video links. With one exception, each teacher received at least four emails with video links. Table 7 shows the number of opportunities/ coaching sessions available to each teacher and the number of emails and videos she accessed. The total number of possible opportunities/coaching sessions varied across teachers (range: 1 – 8). On average, each teacher viewed approximately half (49.45%) of her available videos. Only 3 teachers viewed all of their available videos. Approximately 25% of the teachers ($n = 4$) never viewed a video. Of the teachers who viewed their videos, nearly all viewed the videos multiple times. Teachers replied to an average of 29.67% of emails (range: 0 – 7 replies per teacher). Although an embedded response prompt was part of the email protocol, 56.25% of teachers ($n = 9$) never replied to an email. It was unclear whether these teachers accessed the email. Evidence that five of these teachers accessed their videos, however, suggests they also opened their email messages.

As previously described, each teacher was assigned a score based on her video viewing and email responses. Participation scores were grouped into two categories: low participation in distance coaching and high participation in distance coaching. Eleven teachers were identified as having low participation in distance coaching; five teachers were identified as having high participation. Demographic characteristics of teachers in each group are shown in Table 8. On average, teachers in the high participation group were slightly less experienced than teachers in the low participation group; the high participation group, on average, had fewer children with IEPs and fewer children who were English Language Learners. Relative to the low participation group, more teachers in the high participation group had high-speed Internet in their homes and

had personal email addresses. Ancillary analyses were conducted on each measure to compare outcomes (a) between these two groups and (b) across these two groups and the training only group. Descriptive summaries of these ancillary analyses are provided for the TPOT, CLASS, and classwide measure of challenging behavior.

TPOT scores by participation in coaching. Average TPOT scores by participation are shown in Table 22. Teachers in the high participation group showed a steady increase in TPOT scores across the first three waves. At Wave 3, teachers in the high participation group had average TPOT scores nearly six points above those in the other two groups. There was a decrease in scores at Wave 4 for all groups, but the average Wave 4 score for teachers in the high participation group was above their own average Wave 1 score. High participation teachers' scores were also higher than the Wave 4 scores for the training only and low participation groups. Average TPOT scores for each treatment group across waves are shown in Figure 3.

Table 22

Raw TPOT Score by Participation in Distance Coaching

		Time 1	Time 2	Time 3	Time 4
		<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Low Participation (<i>n</i> =11)	C1 (<i>n</i> =4)	41.25 (11.67)	39 (13.04)	37.75 (9.61)	40.75 (15.52)
	C2 (<i>n</i> =7)	45.29 (13.29)	38 (9.02)	45.86 (12.69)	40.71 (8.79)
	Total	43.82 (12.29)	38.6 (10.03)	42.91 (11.88)	40.73 (10.89)
High Participation (<i>n</i> =5)	C1 (<i>n</i> =3)	47.67 (12.66)	51 (7.94)	52.33 (12.50)	49.33 (15.01)
	C2 (<i>n</i> =2)	29.5 (.71)	39.5 (3.54)	41.5 (3.54)	31 (1.41)
	Total	40.4 (13.39)	46.4 (8.62)	48 (10.79)	42 (14.63)

Note. Low participation means teacher accessed fewer than seven emails or videos. High participation means teacher accessed seven or more emails or videos. Raw TPOT has a maximum score of 108.

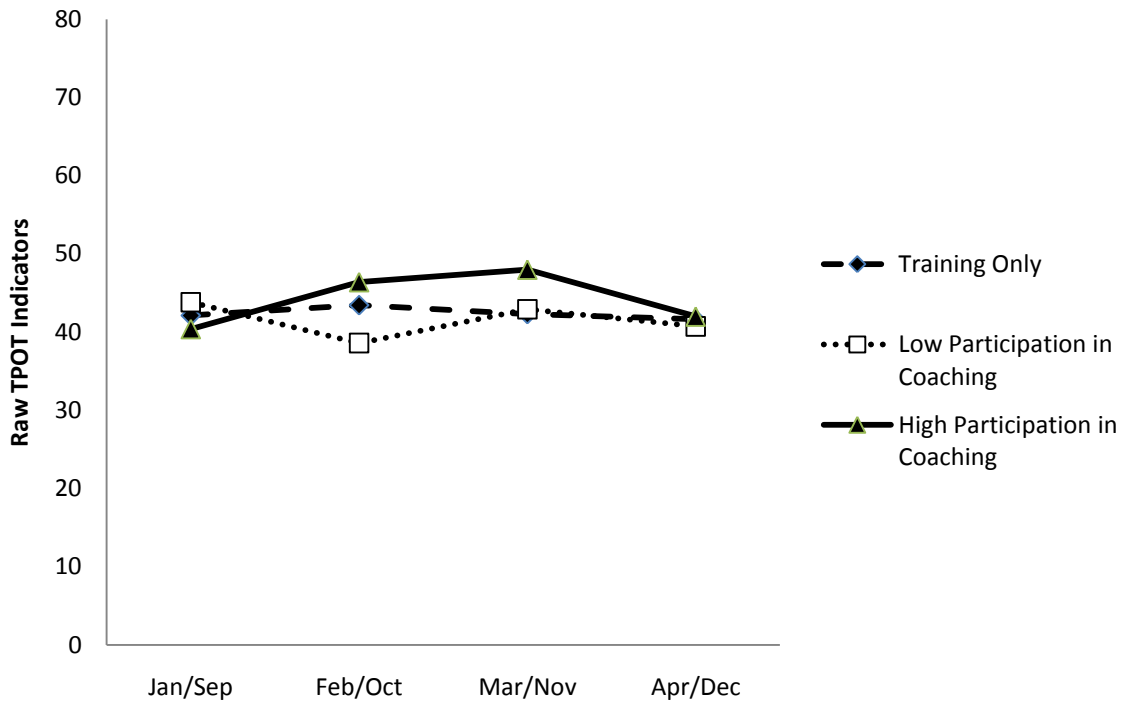


Figure 3. TPOT Scores by Participation in Coaching

To understand fully the effects of coaching for those teachers with high participation scores, we also examined the effects of participation on teachers' scores on the abbreviated Coaching TPOT described previously. These 61 items represented the focus of coaching for all teachers and were not expected to change in the absence of systematic support. The data show a noteworthy pattern. Figure 4 shows average Coaching TPOT scores across waves for each level of participation. Teachers with high participation have slightly lower TPOT scores at Wave 1 ($M = 40.40$, $SD = 13.39$) than teachers in the low participation and training only groups, respectively ($M = 43.82$, $SD = 12.29$; $M = 42.13$, $SD = 14.05$). Scores increased over Waves 2 and 3 before dropping off (for all groups) in Wave 4. Despite the decrease relative to Wave 3, Wave 4 scores

for high participators were higher than the group's Wave 1 scores ($M = 42$, $SD = 14.63$). Scores across waves and levels of participation are shown in Table 23.

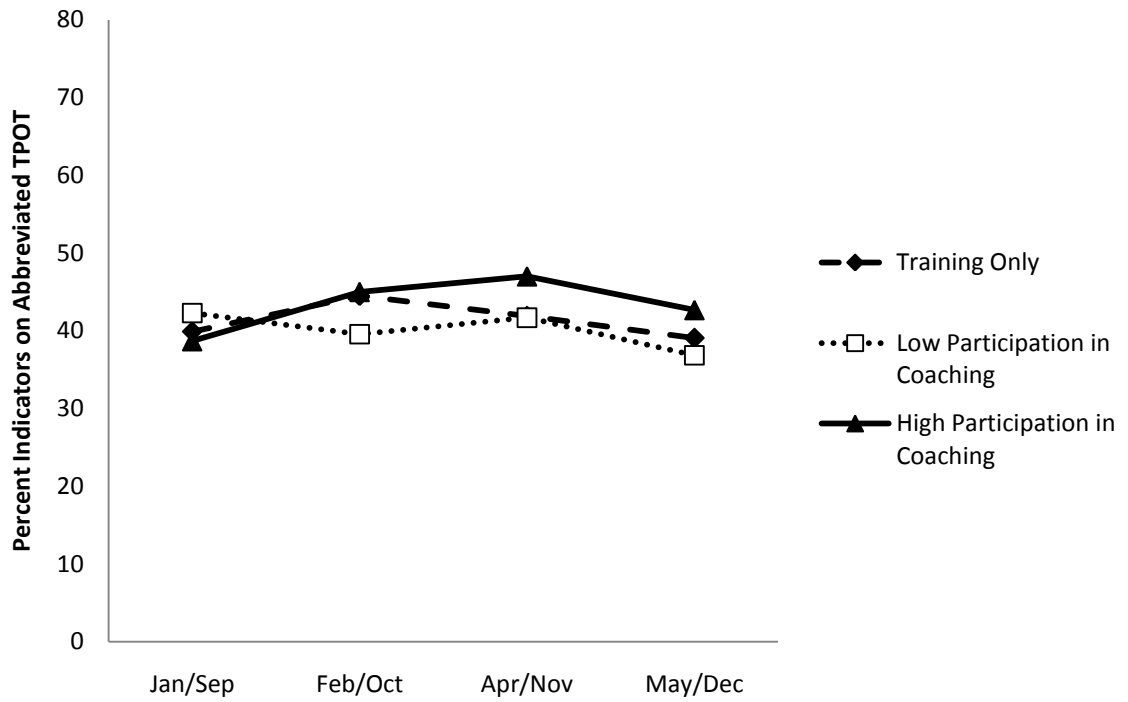


Figure 4. Abbreviated Coaching TPOT by Participation in Coaching

Table 23

Percent of Indicators on Abbreviated Coaching TPOT by Participation in Distance Coaching

		Time 1	Time 2	Time 3	Time 4
		<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>
		(<i>SD</i>)	(<i>SD</i>)	(<i>SD</i>)	(<i>SD</i>)
Low Participation	C1 (<i>n</i> = 4)	43.75 (12.28)	35.00 (10.36)	33.75 (11.49)	36.67 (14.78)
	C2 (<i>n</i> =7)	41.43 (11.84)	42.14 (12.79)	46.19 (18.50)	36.91 (12.04)
	Total (<i>n</i> =11)	42.27 (11.43)	39.55 (11.97)	41.67 (16.87)	36.82 (12.35)
High Participation	C1 (<i>n</i> =3)	43.89 (12.06)	46.11 (6.31)	52.22 (18.73)	48.89 (11.09)
	C2 (<i>n</i> =2)	30.84 (5.89)	43.34 (9.43)	39.17 (1.18)	33.34 (2.36)
	Total (<i>n</i> =5)	38.67 (11.51)	45.00 (6.66)	47.00 (15.06)	42.67 (11.64)

Note. C1= Cohort 1; C2= Cohort 2; Total = Data pooled across cohorts. Abbreviated Coaching TPOT has maximum score of 61.

CLASS scores by participation in coaching. Means and standard deviations for each domain and its composite dimensions are shown in Table 24. On average, both groups of teachers (low participation and high participation) increased their scores in the Classroom Organization domain between Waves 1 and 4. Relative to Wave 1, both groups also had lower scores on the Instructional Support domain at Wave 4. For teachers in the high participation group, average scores increased on two domains: Emotional Support and Classroom Organization. Within these domains, the largest increases were on the Teacher Sensitivity and Behavior Management dimensions. Although the Instructional Support domain score dropped

between Waves 1 and 4, there was a nearly 0.25 unit increase in Quality of Feedback dimension for high participation teachers. Scores for the low participation group decreased across all dimensions associated with Instructional Support.

Table 24

CLASS Dimensions by Participation in Distance Coaching

		Low Participation		High Participation	
		Pre-	Post-	Pre-	Post-
Emotional Support	Positive Climate	4.72 (1.23)	4.82 (1.40)	5.60 (.78)	5.60 (.29)
	Negative Climate	1.16 (.20)	1.09 (.23)	1.25 (.35)	1.25 (.31)
	Teacher Sensitivity	4.23 (1.25)	4.07 (.98)	4.60 (.29)	4.90 (.38)
	Regard for Student Perspectives	4.07 (.98)	3.91 (.89)	4.40 (.14)	4.65 (.74)
	Total Domain Score	4.97 (.85)	4.93 (.79)	5.34 (.32)	5.48 (.37)
Classroom Organization	Behavior Management	4.61 (1.04)	4.91 (.85)	4.45 (.69)	4.80 (.51)
	Productivity	4.32 (.84)	4.59 (1.09)	5.10 (.45)	5.25 (.35)
	Instructional Learning Format	3.14 (1.18)	2.86 (1.06)	4.10 (.63)	3.85 (.55)
	Total Domain Score	4.02 (.89)	4.12 (.85)	4.55 (.47)	4.63 (.17)
Instructional Support	Concept Development	1.63 (.44)	1.48 (.36)	1.85 (.82)	1.40 (.38)
	Quality of Feedback	1.84 (.64)	1.70 (.56)	1.95 (1.04)	2.20 (1.01)
	Language Modeling	2.38 (.75)	1.98 (.52)	2.90 (1.01)	2.60 (.80)
	Total Domain Score	1.95 (.54)	1.72 (.43)	2.23 (.71)	2.07 (.57)

Classwide challenging behavior by participation in coaching. Average percent of intervals with classwide challenging behavior across waves for teachers with both levels of participation are shown in Figure 5. Means and standard deviations for overall challenging behavior across waves and levels of participation are shown in Table 25. High and low intensity behavior by waves and levels of participation are shown in Table 26. At Wave 1, teachers in the high participation group had the highest levels of challenging behavior ($M = 19.11\%$) relative to the low participation and training only groups ($M = 3.79\%$ and $M = 6.92\%$, respectively). For teachers in the high participation group, there was a clear downward trend in challenging behavior across the four waves. Challenging behavior across the other two groups was variable. There were increases in challenging behavior across the first three waves for the low participation group. For the training only group, there was a small increase in challenging behavior at Wave 2, but behavior showed a decreasing trend over the subsequent waves. At Wave 4, however, teachers in the high participation group had the lowest levels of challenging behavior ($M = 2.99\%$) of any group during any wave.

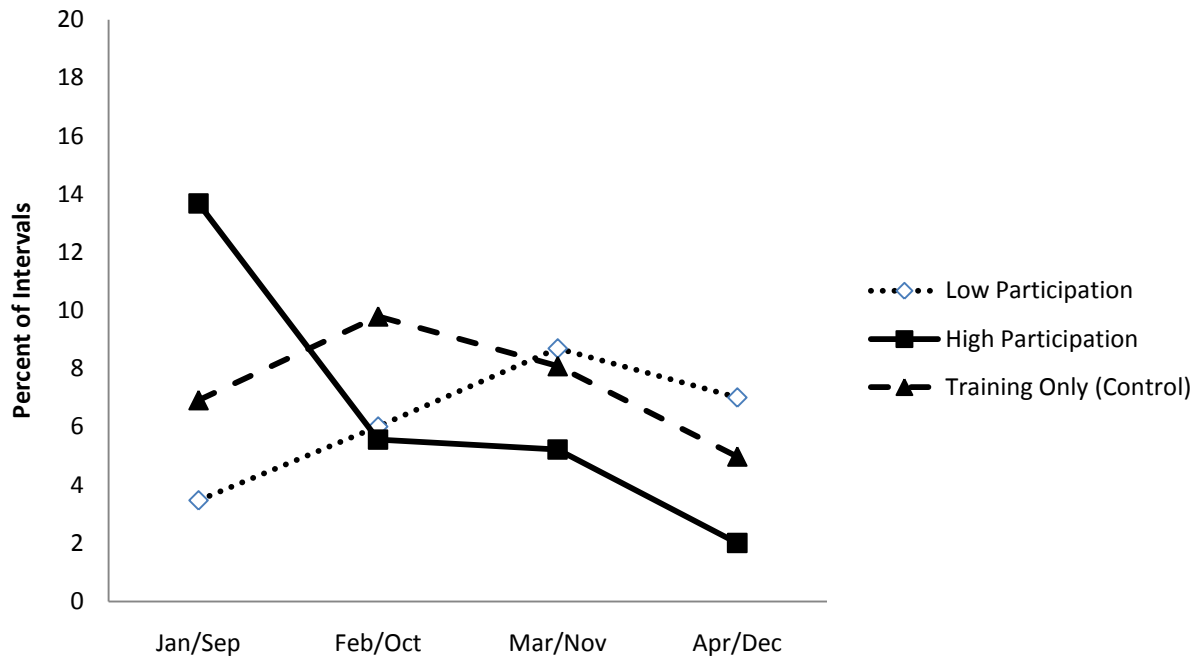


Figure 5. Percentage of Intervals with Classwide Challenging Behavior by Participation in Distance Coaching

Table 25

Classwide Challenging Behavior by Participation in Distance Coaching

		Time 1	Time 2	Time 3	Time 4
Low Participation	C1	3.33 (3.87)	2.57 (3.02)	1.70 (1.87)	2.08 (3.47)
	C2	4.05 (4.58)	5.56 (7.56)	10.56 (13.39)	6.98 (9.02)
	Total	3.79 (4.15)	4.47 (6.27)	7.34 (11.34)	5.19 (7.65)
High Participation	C1	4.44 (4.84)	4.63 (2.79)	8.19 (9.52)	4.26 (4.79)
	C2	41.11 (11.00)	14.72 (7.47)	3.06 (1.96)	1.11 (1.57)
	Total	19.11 (21.10)	8.66 (6.96)	6.13 (7.36)	2.99 (3.88)

Note. C1= Cohort 1; C2= Cohort 2; Total = Data pooled across cohorts.

Table 26

Low and High Intensity Classwide Challenging Behavior by Participation in Distance Coaching

		Time 1		Time 2		Time 3		Time 4	
		Low	High	Low	High	Low	High	Low	High
Low Participation	C1	3.33 (3.87)	.00 (.00)	2.01 (2.75)	.56 (1.11)	1.70 (1.87)	.00 (.00)	2.08 (3.47)	.00 (.00)
	C2	2.94 (3.82)	1.11 (1.06)	2.14 (3.44)	3.41 (5.63)	5.71 (7.66)	4.84 (11.86)	4.75 (7.82)	2.22 (3.91)
	Total	3.08 (3.64)	.71 (.99)	2.09 (3.06)	2.37 (4.64)	4.26 (6.36)	3.08 (9.50)	3.78 (6.49)	1.41 (3.23)
High Participation	C1	4.07 (4.21)	.37 (.64)	4.26 (2.79)	.37 (.64)	5.04 (4.69)	3.15 (4.98)	2.96 (3.78)	1.11 (.96)
	C2	26.94 (3.54)	14.17 (14.53)	9.17 (.39)	5.56 (7.07)	2.78 (1.57)	.28 (.39)	1.11 (1.57)	.00 (.00)
	Total	13.22 (12.99)	5.89 (10.49)	6.22 (3.34)	2.45 (4.56)	4.13 (3.63)	2.00 (3.86)	2.22 (2.96)	.67 (.91)

Note. C1= Cohort 1; C2= Cohort 2; Total = Data pooled across cohorts.

Relation between Implementation of Intervention and Child Social Skills and Problem Behavior

Hierarchical linear modeling (Raudenbush & Bryck, 2003) was used to estimate children's growth trajectories in social skills and problem behavior, as measured by the SSIS, over the course of the professional development intervention period and to evaluate whether differences in level and slope were present across the two intervention conditions. A three-level hierarchical model was specified. This model contained time nested within children and children nested within classrooms and treatment groups. Four waves of data contributed to the model. HLM was conducted separately for the Social Skills subscale and the Problem Behavior subscale of the SSIS. Standard scores were calculated from sex-specific norms for children ages 3 – 5. Standard scores have a mean of 100 and a standard deviation of 15. The Social Skills subscale is scored positively; higher scores are desirable. Because the Problem Behavior subscale assesses negative behaviors, lower scores are desirable.

Defining the sample. The SSIS is not normed for children under 3 years of age. All Early Head Start classrooms were removed from the analysis. Therefore, the sample size for the SSIS analysis was 24 teachers at Level 3 and 338 children at Level 2. Data were inspected for descriptive statistical properties prior to analysis. Descriptive data for the four repeated measures of social skills and problem behavior ratings are presented in Table 27. On average, social skill ratings increased across time, problem behavior ratings decreased over time, and there appeared to be variability across individuals. Based on skewness and kurtosis statistics and visual analysis of histograms, stem-and-leaf plots, and residual plots, all SSIS data seemed to follow linear trajectories. In addition to the attrition described in the Participants section, the Level 1 (individual child repeated measures) files were also analyzed for missing data. Missing data occurred for three reasons: (a) the child left the study as previously described ($n = 48$ units at

Level 1), (b) one teacher missed a wave of data collection ($n = 11$ units at Level 1), and (c) data missing at random ($n = 14$ units at Level 1). Calculations were modeled on the remaining 1279 repeated units of measurements at Level 1.

Table 27

Means and Standard Deviations for SSIS Social Skills and Problem Behavior

		Time 1		Time 2		Time 3		Time 4	
		SS	PB	SS	PB	SS	PB	SS	PB
Training Only	C1	93.02 (4.26)	109.41 (5.16)	94.19 (4.27)	107.17 (11.56)	95.93 (5.75)	101.11 (11.91)	96.99 (7.52)	103.73 (13.89)
	C2	96.63 (9.88)	103.43 (12.97)	101.29 (12.18)	102.49 (10.40)	101.11 (13.94)	102.55 (12.49)	111.41 (12.09)	97.25 (12.42)
	TOTAL	95.13 (7.96)	105.92 (10.53)	98.33 (10.04)	104.44 (10.65)	98.95 (11.19)	101.95 (11.72)	105.39 (12.47)	99.95 (12.86)
Training Plus Coaching	C1	95.79 (16.64)	103.59 (7.22)	90.08 (13.26)	102.27 (10.22)	92.52 (5.76)	101.72 (9.34)	95.77 (15.92)	101.47 (11.67)
	C2	92.42 (14.59)	103.18 (5.91)	93.84 (6.91)	103.07 (6.75)	104.13 (9.24)	98.29 (6.40)	103.71 (12.39)	97.08 (6.72)
	TOTAL	93.95 (14.85)	103.36 (6.19)	92.13 (9.90)	102.71 (8.05)	98.85 (11.84)	99.85 (7.66)	100.09 (13.97)	99.08 (9.07)

Note. C1= Cohort 1; C2= Cohort 2; Total = Data pooled across cohorts. Sample does not include Early Head Start population.

Building a model for social skills. A taxonomy of multilevel models for change was fit to the SSIS social skills data. All analyses used full maximum likelihood estimation procedures. A summary of the selected models is shown in Table 28.

Table 28

Results of Fitting a Taxonomy of Multilevel Models for Change to SSIS Social Skills Data

		Unconditional Model	Linear Growth Model- Fixed Effects	Quadratic Growth Model	Model 1: Coaching	Model 2: Full interaction	Model 3: Final Model
Fixed Effects	Intercept	97.52***	94.47***	94.74***	95.53***	100.08***	99.06***
	Risk for PB					-15.19***	-15.02***
	Coaching				-2.06	-2.04	
	PB X Coach					-9.68***	-10.02***
Random Parameters	Intercept		2.09***	.38 (<i>p</i> = .88)	2.28***	1.85***	1.88***
	WaveSq			.67 (<i>p</i> = .38)			
	Risk for PB					1.55**	1.52**
	Coaching				-.41	-.89*	-.95*
	PB X Coach					3.56***	3.62***
Variance	Level 1 Intrept, R0	100.90***	101.80***	119.64*** 6.36 1.51	101.74***	67.47***	67.46***
	Level-1 E	102.28	95.28	63.69	95.23	91.91	91.91
	Intrept1, U00	78.27***	77.57***	110.31*** 133.57*** 12.13***	75.79***	74.14***	75.17
Goodness of Fit	Deviance	9907.12 (4)	9839.59 (5)	9628.93 (16)	9838.43 (7)	9704.43 (11)	9704.71 (10)
	R ²	- ICC = .4966	.07	.38	.07	.10	.10

Note. *** = $p < .00$, ** = $p < .05$, * = $p < .2$

To create a meaningful metric of time, each round of SSIS data was identified by wave number (1 – 4). Time was centered at Wave 1 and increased by one unit every 30 days. Thus, growth trajectories could be interpreted as consisting of average social skill ratings at Wave 1 (intercept) and average rate of change in social skill ratings per month (slope).

Before adding any predictors to the model, an unconditional model was used to assess linearity and variance at Levels 1 and 2. Based on the unconditional model, it was decided sufficient variance was present at Level 2 to conduct an HLM model. Next, an unconditional linear growth model with random intercepts and random slopes was constructed with time centered at Wave 1. No predictor variables were entered in this model. The results of this model indicated there was no statistically significant variance in the slopes at Level 2 (child level), so this term was fixed statistically for the remaining models. Line-plots of child data indicated the possible presence of a non-linear function. A quadratic term was added to the model, but its term was not statistically significant and it did not affect the deviance statistic. For simplicity of interpretation and parsimonious analysis, a linear model was used.

Predictor variables were then added to the specified model according to the research hypotheses. First, coaching was added at Level 2. Coaching was dummy-coded with 1 representing a teacher in the Training plus Coaching group. Next, risk for problem behavior was added (PB Risk). Risk for problem behavior was defined as having standard scores *Above Average* or *Well Above Average* on the Problem Behavior scale of the SSIS at Wave 1. An interaction term (PB X Coaching) was created to evaluate differential effects of coaching on teachers' ratings of children with problem behavior risk. All predictors (Coaching, PB Risk, and PB X Coaching) were dichotomous, so they were not centered. Model building proceeded from unconditional to more complex conditional analyses. As model building progressed, terms that

were not statistically significant were deleted from successive models. The final model specified was:

$$\text{Level 1: } Y_{ijt} = \pi_{0jt} + \pi_{1jt}(\text{WAVE1}) + e_{ijt}$$

$$\text{Level 2: } \pi_{0jt} = \beta_{00t} + \beta_{01t}(\text{COACHING}) + r_{0jt}$$

$$\pi_{1jt} = \beta_{10t} + \beta_{11t}(\text{PBRISK}) + \beta_{12t}(\text{COACHING}) + \beta_{13t}(\text{PB X COACHING})$$

$$\text{Level 3: } \beta_{00t} = \gamma_{000} + U_{00t}$$

$$\beta_{01t} = \gamma_{010}$$

$$\beta_{02t} = \gamma_{020}$$

$$\beta_{03t} = \gamma_{030}$$

$$\beta_{10t} = \gamma_{100}$$

$$\beta_{11t} = \gamma_{110}$$

$$\beta_{12t} = \gamma_{120}$$

$$\beta_{13t} = \gamma_{130}$$

In this model, Y_{ijt} is the SSIS Social Skills standard score for child i in classroom j at time t . This score is modeled as a function of time for child i , where time is centered at Wave 1 and consists of four repeated measurements, plus residuals. π_{0jt} represents the intercept SSIS Social Skills standard score value for child i and is composed of β_{00t} , the average standard score of the sample of children (π_{0jt}) plus effects of assignment to the coaching condition plus residuals. π_{1jt} represents the initial growth trajectory of child i in class j at time t . It is composed of the effects of child i 's problem behavior risk, assignment to coaching, and the interaction between behavior risk and coaching. The effects were fixed for slope. The nested nature of the data is represented by classroom level effects at Level 3.

Results for social skills. The unconditional model (SSIS Social Skills standard scores with no predictors at Level 1 or Level 2) produced a mean Time 1 Social Skills score of 97.52 ($SD = 1.92$; variance = 102.28). The intraclass correlation coefficient (ICC) from the unconditional model indicated 49.66% of variance was between-group variance rather than individual variance. This indicated that a large proportion of variance was present at Levels 2 and 3. There was no statistically significant variance in the slope at Level 1, so this effect was fixed.

The final model predicting social skills growth trajectories was expanded to include teachers' participation in coaching, a child's risk for problem behavior, and the interaction between coaching and risk for problem behavior at Level 2. Results of the final model are shown in Table 29. All of these predictors were statistically significant at $p < .20$. Controlling for coaching, problem behavior, and their cross product, the average Social Skills standard score was 99.06 ($SE = 1.93$; $p = .0001$). Children at-risk for problem behavior scored, on average, 15.02 points lower on the Social Skills scale at Wave 1 than did children with typical behavior ($p = .0001$). For students with problem behavior whose teachers received coaching, the average score was only 10.02 points below average at Wave 1 ($p = .003$). The growth trajectory of students at-risk for problem behavior was also affected by coaching. Students whose teachers did not receive coaching increased, on average, 1.88 units per wave ($p = .0001$). The social skills rating of children whose teachers received coaching *decreased*, on average, 0.95 units per wave ($p = .08$). For children at risk for problem behavior whose teachers received coaching, however, social skill ratings increased 3.62 units per wave ($p = .003$). This interaction is shown in Figure 6.

Table 29

HLM Results Modeling the Effect of Coaching on Social Skills

Fixed Effects	Coefficient	<i>SE</i>	<i>t</i> -ratio	Approx <i>df</i>	<i>p</i> -value
Intercept (π_{0jt})					
Mean SS	99.06	1.93	51.44	23	.00
PBRisk	-15.02	2.03	-7.41	335	.00
PB X Coaching	-10.02	3.23	-3.10	335	.00
For Wave1 β_{01k}					
Mean SS γ_{010}	1.88	.39	4.88	1244	.00
PBRisk	1.52	.75	2.02	1244	.04
Coaching γ_{011}	-.95	.55	-1.74	1244	.08
PB X Coaching	3.62	1.21	2.99	1244	.00
Final estimation of variance components					
Random effect	<i>SD</i>	Variance component	<i>df</i>	χ^2	<i>p</i> -value
Level 2 intercept (U00)	8.67	75.17	23	298.93	.00
Level 1 (R)	8.21	67.46	312	1170.27	.00

Note. Deviance = 9704.71. Full maximum likelihood estimations. Unconditional model $r = 102.28$. Coefficients with p -values less than .2 were considered significant. Mean SS = Mean standard score on the Social Skills subscale of the Social Skills Intervention System; PB Risk = child was rated as Above Average or Well Above Average on the Problem Behavior subscale of the SSIS; Coaching = the child's teacher was assigned to the Training + Coaching condition.

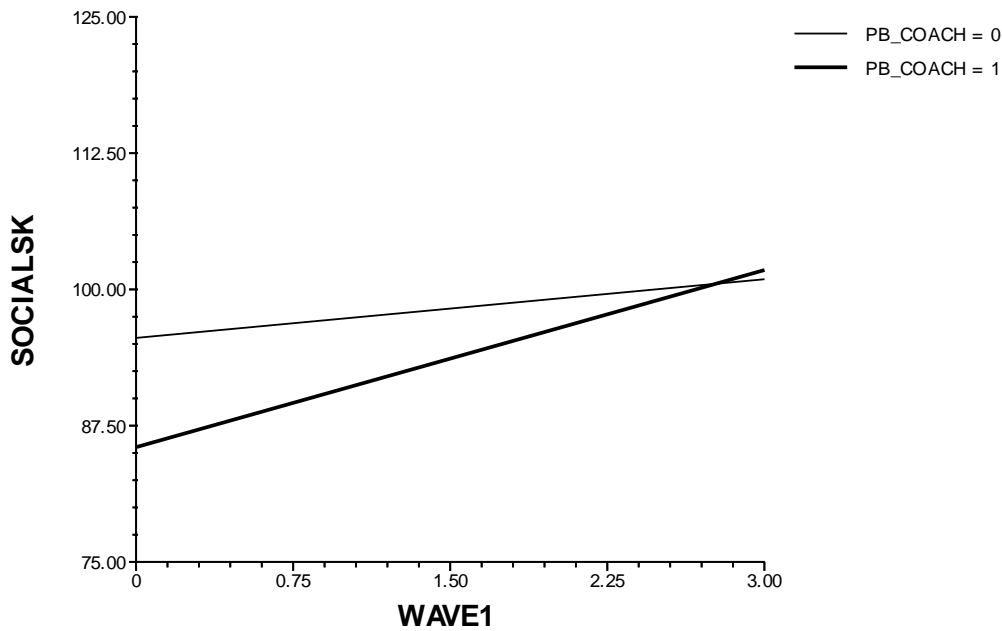


Figure 6. Interaction between Coaching and Initial Rating of Problem Behavior on Teachers' Ratings of Children's Social Skills

Note. PB_Coach = 0 growth trajectory for children without problem behavior whose teachers may or may not be receiving coaching. PB_Coach = 1 growth trajectory for children with above average problem behavior whose teachers are receiving coaching.

Building a model for problem behavior. As with Social Skills, a taxonomy of multilevel models for change were fit to the SSIS problem behavior data. A summary of each model is shown in Table 30. Time was centered at Wave 1 as described previously. An unconditional model was used to assess linearity and variance at Levels 1 and 2. Based on the unconditional model, it was decided that sufficient variance was present at Level 2 to conduct an HLM model.

Table 30

Results of Fitting a Taxonomy of Models on Problem Behavior

		Unconditional Model	Linear Growth Model- Fixed Effects	Model 1: Coaching	Model 2: Final
Fixed Effects	Intercept	102.26***	104.18***	105.71***	105.78***
	Coaching			-3.09 (p=.34)	-3.16 (p = .34)
Random Parameters	Intercept		-1.33***	-1.31***	-.78**
	Risk for PB				-1.95***
	Coaching			-.03 (.96)	-.34 (p = .64)
	PB X Coach				.72 (p = .52)
Variance	Level 1 Intrcpt, R0	113.42***	113.19***	113.29***	129.56***
	Level-1 E	102.52	99.84	99.83	95.52
	Intrcpt1, U00	52.27***	52.01***	49.21***	51.54***
Goodness of Fit	Deviance	9991.86 (4)	9965.16 (5)	9964.20	9956.61 (9)
	R ²	-	.03	.03	.07

Note. ***=p<.00, **= p <.05, * = P <.2

Visual analysis of plotted data and residuals indicated relatively linear trajectories for the problem behavior subscale. Therefore, a linear model was constructed. Predictor variables for

coaching, risk for problem behavior, and the interaction between the two were then added according to the research hypotheses. Following initial analyses, the following model was built:

$$\text{Level 1: } Y_{ijt} = \pi_{0jt} + \pi_{1jt}(\text{WAVE1}) + e_{ijt}$$

$$\text{Level 2: } \pi_{0jt} = \beta_{00t} + \beta_{01t}(\text{COACHING}) + r_{0jt}$$

$$\pi_{1jt} = \beta_{10t} + \beta_{11t}(\text{PBRISK}) + \beta_{12t}(\text{COACHING}) + \beta_{13t}(\text{PB X COACH})$$

$$\text{Level 3: } \beta_{00t} = \gamma_{000} + U_{00t}$$

$$\beta_{01t} = \gamma_{010}$$

$$\beta_{02t} = \gamma_{020}$$

$$\beta_{03t} = \gamma_{030}$$

$$\beta_{10t} = \gamma_{100}$$

$$\beta_{11t} = \gamma_{110}$$

$$\beta_{12t} = \gamma_{120}$$

$$\beta_{13t} = \gamma_{130}$$

In this model, Y_{ijt} is the SSIS Problem Behavior standard score for child i in classroom j at time t . This score is modeled as a function of time for child i , where time is centered at Wave 1 and consists of four repeated measurements, plus residuals. π_{0jt} represents the intercept SSIS Problem Behavior standard score value for child i as a function of coaching plus residuals. Risk for problem behavior was not included in the intercept term because the risk term was created based on standard scores from the Problem Behavior subscale. Children whose scores were above average (or well above average) were considered at-risk. Therefore, the risk term and Problem Behavior standard score were interconnected and highly correlated. Risk for problem behavior was included in the slope equation (π_{1jt}). It was hypothesized that coaching might have differential effects on teachers' perceptions of children with the most challenging behavior. β_{00t}

represents the average standard score of the sample of students (π_{0jt}) plus effects of assignment to the coaching condition, a child's problem behavior risk, and residuals. Classroom level effects are modeled in Level 3.

Results for problem behavior. The unconditional model (with no Level 1 or Level 2 predictors) resulted in an average problem behavior score of 102.26 for child i in class j at time t . The ICC indicated 52.52% of variance was between-group variance rather than individual variation. This provided sufficient variance to model at Levels 2 and 3. An unconditional linear growth model was constructed. There was no statistically significant variance in the Level 2 slope, so the effects of this term were fixed statistically. The results of the final HLM model are shown in Table 31.

Table 31

HLM Results Modeling the Effect of Coaching on Problem Behavior

Fixed Effects	Coefficient	SE	t-ratio	Approx df	p- value
Intercept (π_{0jt})					
Mean PB (β_{00k})	105.78	2.34	45.22	23	.000
PBRisk					
Coaching	-3.16	3.33	-0.95	336	.34
PB_Coaching					
Age Slope π_{1jt}					
Intercept γ_{100}	-0.78	0.39	-2.03	1253	.04
PBRisk	-1.95	0.69	-2.83	1253	.005
Coaching γ_{101}	-0.34	0.55	-0.62	1253	.54
PB X Coaching	0.72	1.11	0.65	1253	.52
Final estimation of variance components					
Random effect	SD	Variance component	df	χ^2	p-value
Level 2 intercept (U00)	7.18	51.54	23	132.74	.000
Level 1 (R)	11.38	129.56	313	1872.57	.000

Note. Deviance = 9956.61. Full maximum likelihood estimations. Unconditional model $r = 102.52$. Coefficients with p -values less than .2 were considered significant. Mean SS = Mean standard score on the Social Skills subscale of the Social Skills Intervention System; PB Risk = child was rated Above Average or Well Above Average on the Problem Behavior subscale of the SSIS; Coaching = the child's teacher was assigned to the Training + Coaching condition.

The average Problem Behavior scale rating at Wave 1 was 105.78 ($SE = 2.34$; $p = .0001$), and the average rate of growth was -0.78 units per month ($SE = .39$; $p = .04$). Because the Problem Behavior scale rates negative behavior, a decreased score is a desired outcome. With alpha set at .20, coaching was not a significant predictor of average behavior ratings at Wave 1 ($p = .34$). However, risk for problem behavior was a significant predictor of growth. Being classified as at risk was associated with a -1.95 unit decrease in ratings per month ($p = .005$). This term should be interpreted with caution for two reasons: its potential reflection of regression

to the mean and its relationship to the outcome variable (PBRisk was defined by a child's Problem Behavior subscale score at Wave 1). Coaching and the interaction between problem behavior and coaching were not statistically significant predictors of growth trajectories. The effects of the interaction between a child's initial problem behavior score and experimental condition on teachers' rating of children's problem behavior is shown in Figure 7.

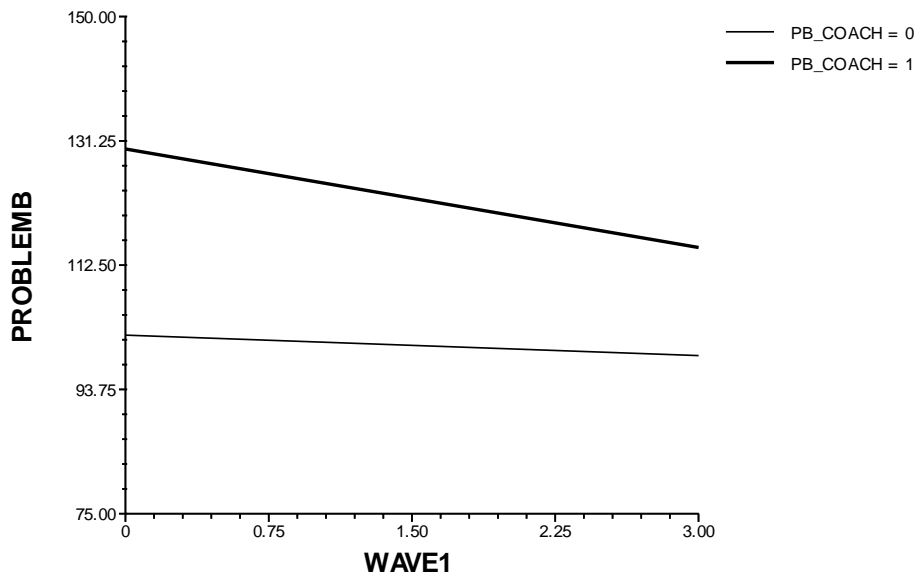


Figure 7. Interaction between Distance Coaching and Initial Level of Problem Behavior on Teachers' Ratings of Children's Problem Behavior

Note. PB_Coach = 0 growth trajectory for children without problem behavior whose teachers may or may not be receiving coaching. PB_Coach = 1 growth trajectory for children with above average problem behavior whose teachers are receiving coaching.

Teachers' Perception and Satisfaction with Training and Coaching

Teacher questionnaire. Teacher responses to the social validity questionnaire are shown in Table 32. Data are presented by treatment group and cohort. Approximately 85% of teachers ($n = 28$) completed the questionnaires. Because questionnaires differed slightly across training only and training plus coaching groups, we could discern that all non-responders ($n = 5$) were in the training only group. Questionnaires were completed anonymously and returned to the investigator via U.S. mail.

Table 32

Average Ratings of Intervention Elements on Final Teacher Questionnaire

	Training Only		Training plus Coaching	
	C1	C2	C1	C2
The training helped you learn to use TP strategies.	5	4.75	4.88	5.00
The implementation guides you received helped you use TP strategies.	5.13	4.75	4.63	5.25
The classroom materials you received helped you use TP strategies.	5.14	5.25	4.75	5.63
You could have implemented the strategies just as well without having attended the training.	3.13	3.75	4	2.88
You could have implemented the strategies just as well without having received the Implementation Guides.	2.88	2.5	3.88	3.13
The TP strategies you implemented had a positive effect on children's behavior or social skills in your classroom.	5.13	4.75	4.38	5.13
As a result of the training and/or coaching, you have new strategies to consider when dealing with children with challenging behavior.	4.71	5.00	4.38	5.50
Your teaching practices have changed due to the training you received on the TP.	4.5	4.75	3.88	4.31
You will use TP strategies in your classroom next year.	4.86	5.5	4.25	5.75
You would suggest the TP strategies/training to other teachers.	5.29	5.00	3.88	5.50
The amount of time needed to actively participate in the study was reasonable.	4	3.75	4.5	4.06
Working with a "distance coach" helped you use <i>Teaching Pyramid</i> strategies.	NA	NA	4.13	3.88
Watching videos of your own classroom was helpful.	NA	NA	4.38	4.63
The online video library was easy to access.	NA	NA	4.13	4.57

Note. All items were rated on a scale of 1 (*Strongly Disagree*) to 6 (*Strongly Agree*).

On average, teachers responded positively to training, materials, and coaching. The highest rated item on the questionnaire related to receiving classroom materials (puppets, books, posters, etc.). Satisfaction with training was slightly higher than satisfaction with coaching. The average rating for each item across teachers was calculated. These scores were summed and divided by the total number of questions on the questionnaire to arrive at an average rating for training. On a scale of 1 - 6, the average satisfaction rating for training was 4.95 ($SD = .21$; range: 4.80 – 5.58). The item with the lowest average score was “My teaching practices will change as a result of this training.” The item with the highest average score was “The trainer was knowledgeable and answered my questions.” Average satisfaction with coaching was calculated by summing the average rating across teachers in the training plus coaching group on the three items associated specifically with coaching. Average scores per item were summed and divided by 3 to reach an average satisfaction rating. Teachers in the training plus coaching group found viewing videos of their own classroom helpful ($M = 4.51$ on a scale of 1- 6; $SD = 0.18$; range: 4.38 – 4.63) but found working with a distance coach slightly less helpful ($M = 4.01$; $SD = 0.18$; range: 3.88 – 4.13). The library of online video exemplars received an average score of 4.35 ($SD = 0.31$; range: 4.13 – 4.57). Written responses to open-ended questions were collected and analyzed with focus group data as described in the next section.

Focus groups. All teachers in the training plus coaching group were invited to participate in a focus group moderated by the investigator. For the teachers’ convenience, focus groups were held at each center. Therefore, participants in each focus group came from the same center; there were no cross-site focus groups. When groups of teachers could not leave the classroom at the same time due to staffing issues, individual interviews were conducted. Focus groups and individual interviews followed the same scripted protocol. There were seven focus

groups/interviews conducted across the two cohorts. During Cohort 1, there was one individual interview and two groups of two teachers each. During Cohort 2, there were two individual interviews and two groups of three and four teachers, respectively. Two teachers from one center in Cohort 1 did not consent to participate. One of these teachers was described previously and had only one child who could be filmed. The remaining 14 teachers consented to participate.

The average length of focus groups was 12.17 minutes (range 5 min 55s – 19 min 18s). The focus group script is shown in Appendix L. Focus groups were audiotaped, transcribed, and analyzed for themes by the investigator and a second trained analyst. The investigator and the second reader coded the transcripts independently. Next, the two coders met to compare themes and discuss interpretations until a consensus was reached. Based on focus groups and written responses to open-ended questions on the teacher questionnaire, both coders independently identified five themes: (a) the value of seeing oneself on video, (b) the value of watching video exemplars, (c) the value of feedback, (d) issues with filming, and (e) issues with access. These themes are presented in terms of benefits and barriers in Table 33. The number of times a specific benefit or barrier was mentioned is included in parentheses beside each item. Specific participants could not generally be identified in the transcripts, so the specific number of participants who identified each benefit or barrier cannot be described.

Table 33

Benefits and Barriers Associated with Web-Mediated Coaching (and Frequency of Responses)

Themes	Benefits	Barriers
Seeing oneself on Video	Meaningful/ Enjoyment (6)	Dislike seeing self (3)
	Interactions with children (6)	Editing distracting (2)
	Reflection (5)	
	Non-judgmental (3)	
Video Exemplars	New/ useful ideas (4)	Short segments (1)
	Relevant to my class (2)	
Feedback	New/ useful ideas (5)	Prefer personal contact (7)
	Positive examples (3)	Could not/ did not access (4)
	Convenient (2)	
	Can share with team (2)	
Filming	Knew what to expect (2)	Initial fear of being filmed (11)
	Unobtrusive (5)	Child consent (5)
		Fear of kids “acting out” (4)
Access	Convenient at home (4)	Time at work (18)
		Work computers (7)
		Low-speed internet (6)
		Video problems (6)
		Time at home/family (2)
		Web-navigation (1)

Value of seeing oneself on video. Overall, teachers identified more benefits than drawbacks associated with viewing one's own videos. Four sub-themes emerged during the conversations. First, some teachers found the videos meaningful or enjoyable to watch (e.g., "It was wonderful to go and look at yourself. I don't think there could be anything more meaningful than a video of yourself in the moment."). Second, teachers enjoyed the opportunity to reflect on their own practice. Several teachers mentioned the benefits of seeing themselves in action. As one teacher said, "I could see things that I was already doing that I didn't even know I was already doing." More specifically, teachers appreciated the opportunity to see their own interactions with children. They reported becoming more aware of their tone and facial expressions. As one preschool teacher said:

I like going and reflecting on the day... looking at your facial expressions and how the kids react to your face and what you're saying. A lot of times, whenever you're teaching, you're in the moment, you're not paying attention to how you're reacting or how the children are reacting to you. So going back later on, you know, quietly and relaxing and paying attention to what is actually going on, it brings it to life....It gives a reflection of what we're doing and what we need to work on.

Finally, teachers described the importance of viewing their own videos in a supportive, nonjudgmental context. It was important to the teachers that their videos could only be viewed by herself and the coach. Said one teacher, "It was interesting because you got to just look at it and not feel like anybody else was judging you...I felt like we were helping you learn from what we were doing, and we were learning from you guys at the same time. It was a partnership."

Teachers' comments indicated that they felt a coaching relationship had been developed.

Several teachers noted barriers associated with viewing their videos, however. At least two teachers reported feeling highly uncomfortable viewing their own images. Even teachers who reported enjoying their videos mentioned occasional mild discomfort (e.g., “I hope I don’t wear the same clothes every week.”). Because two teachers with low participation did not consent to participate in the focus group, we cannot know how their opinions might have added to the conversation. Reports from the teacher questionnaire supported general feelings of discomfort from some teachers (“I really don’t enjoy being videotaped or watching myself on video.”). Other teachers identified video editing as a barrier to their reflection on the videos. Two teachers found the edited video clips confusing (i.e., the video clip starts outside and then the screen transitioned to group time on the carpet). Typically, when drastic editing took place it was used to demonstrate a specific skill (i.e., a behavior happened on the playground and the teacher lead a group discussion about it afterwards). Clearer on-screen transition cues or subtitles may have eased the confusion.

Value of viewing video exemplars. Teachers identified the exemplar videos from the Center on the Social Emotional Foundations for Early Learning (CSEFEL) as sources of new ideas and information. They noted that the videos were aligned to what was happening in their own classrooms. Teachers discussed one drawback of the video exemplars: the videos were too brief and did not show the full cycle of most situations. As one teacher said, “What you need to see whenever someone is trying to learn something new from [a video] is: What did they do to lead up to that moment and how are they going to exit out? We never saw that.”

Value of email feedback. Teachers described four benefits of email feedback: convenience, ability to share it with others, positive feedback, and new ideas. Email feedback was flexible and allowed teachers to access it whenever they liked. One teacher told us, “I really

did enjoy [reading them] over the weekend. Real late at night. That's my life. I liked that." The same teacher also described the value of the emails for her team. She printed emails (and articles or resources attached to the emails) and gave them to other teachers and staff. A teacher in a different center and cohort described a different teaming strategy, "[My co-teacher] looked at it. She would come back and tell me what went on, what we should do different, or what was good." Teachers reported enjoying getting positive feedback (e.g., "It was useful to see the feedback and what [we] were actually doing correct."). They also reported using the ideas or resources included in the email feedback.

Although some teachers enjoyed the flexibility of email feedback, other teachers identified email as a barrier. Several teachers could not consistently access email at work and did not have Internet at home. Additionally, several teachers mentioned preferring more personal contact (e.g., "I absorb more face-to-face" and "Out of sight, out of mind"). Teachers also suggested that in-classroom support could supplement email feedback. The teacher with the highest participation score suggested: "Maybe if somebody could come in and hands-on show you [how to do something]. Like coming in before you start videoing and actually showing you what to do."

Responses to filming. An important feature of the filming process for these teachers was predictability. Teachers appreciated knowing what to expect from week to week: when the videographer was coming, what he would be filming, and how long he would be staying. For Cohort 1, classrooms were filmed at the same time every week. During focus groups, teachers reported they would have liked filming a variety of activities: "Actually at the end, we tried to reschedule the work day so you all could...see [other activities]. That's the only change I could see: [not] seeing the same activity every time." This input was taken into consideration while

planning Cohort 2. Across cohorts, teachers reported the filming was unobtrusive. Many teachers reported, “it was like he was part of our class.” Negative feedback on the written questionnaires must be considered, however. One teacher wrote, “Unfortunately the videotaping was a big negative. I was not natural in my lesson presentations. Only 8 children had permission so I tended to choose them when asking questions and participating in the lesson.”

An overwhelming barrier to filming, and a consistent theme across most participants, was the initial fear of being filmed. Nearly all teachers reported this fear went away after the first session. Nonetheless, it was an important factor in teachers’ comfort with the project. Teachers had concerns about how they looked and sounded on film and how they would be perceived. They were also concerned about how children would behave. The fear of “acting out” was mentioned in several focus groups. Teachers, like the one in the previous paragraph, also mentioned barriers with child consent for filming. Several teachers mentioned a particular child they wished could have been filmed. Often, this was a child with challenging behavior. One teacher said, “When it was time for videoing, the kids that I felt like it could have been more beneficial for were the kids that weren’t in the study at all...Even though I implemented it for him when the camera wasn’t on...just to see him on camera would have been great.”

Access issues. Perhaps the most consistent finding across focus groups was issues of access. Only a small number of comments was made to suggest that accessing the coaching materials was easy or convenient. Teachers who reported convenient access preferred to access the materials from home. Across focus groups and cohorts, teachers reported near universal inability to access emails and videos from work. Even if access was available, teachers reported a lack of time to do so. Their regular work commitments (paperwork, reports, planning, meetings) used all available time during the work day. For the Early Head Start classrooms and

extended-day programs, staffing issues prevented teachers from being able to leave the classroom for the length of time necessary to view videos and read email. Finally, technical difficulties prevented some teachers from accessing the website. Teachers reported slow download speeds for videos, problems playing the video (buffering, stopping and starting), problems with sound on work computers, and difficulties navigating the website.

CHAPTER IV

DISCUSSION

The purpose of this study was to evaluate the effects of a professional development intervention that consisted of training alone versus training with distance coaching on teachers' implementation of *Teaching Pyramid* practices and children's social skills and challenging behavior. Training plus distance coaching was not associated with statistically significant changes in observed implementation of *Pyramid* practices or overall levels of children's challenging behavior. There was, however, a small but statistically significant effect of coaching on overall classroom climate. The effect size was small (0.23), but this is consistent with other studies of web-mediated professional development that have used the CLASS as an outcome measure (Pianta et al., 2008). This finding provides preliminary support for the possible "value added" of distance coaching relative to training alone at improving the climate of early childhood classrooms.

This study also found significant effects of coaching on teachers' perspectives about children with the most severe challenging behavior as measured by the SSIS. For children who were rated *Above Average* or *Well Above Average* for problem behavior on the SSIS, being in the classroom of a teacher who received coaching was associated with a three-unit increase in social skill ratings relative to a child whose teacher had not received coaching. Because the SSIS is based on teacher report—and teachers were obviously not blind to treatment condition—this effect may be the result of correlated measurement error. Teachers' knowledge of when treatment began might have increased the risk of Type I error by systematically overestimating

“true score” during the treatment phase. Although correlated measurement error is a potential limitation and must be considered, it is present in nearly all studies involving rating scale data. Given the widespread use of instruments like the SSIS for screening in tiered intervention models, such as School-wide Positive Behavior Support, it is important to study how teachers’ perspectives about children change as a result of experience with certain interventions. The teacher-child relationship is critical to early learning (Howes & Smith, 1995), and challenging behavior can strain this relationship (Strain et al., 1983). Improving teachers’ perspectives about young children’s social skills and problem behaviors could be considered an important effect of treatment.

A major feature of this study was the use of a web-mediated professional development intervention. Like Pianta et al. (2008) and Powell et al. (in press), coaches reviewed video clips of teachers engaging in interactions with children and provided written performance feedback. In the current study, feedback was delivered via email and videos were made available to each teacher on a password protected website. In the Pianta et al. study, written feedback was posted along with a video clip on the MTP website and was followed by a web chat. In the Powell et al. study, feedback was delivered using split screen technology (the video played on one side of the screen while written feedback appeared on the other). The present intervention was relatively brief (average of 6 sessions per teacher). Powell et al. (in press) report a marginally higher average number of sessions (7.3) with a range of 3 – 8 video sessions per teacher across their 15-week literacy coaching intervention. Their intervention was associated with significant improvements in teacher literacy behaviors and child outcomes. For most interventions around social-emotional development or challenging behavior, however, the length of intervention has been much longer. Hemmeter, Snyder, and Fox (in progress) found that teachers coached on the

Teaching Pyramid model by in-classroom coaches required 12 - 14 coaching sessions across the school year to see significant improvements in teacher implementation. It should be noted that the coaching sessions in the Hemmeter et al. study were more intense than those described in the current study and included an hour per week of classroom support (observing, modeling), approximately 30 min per week of structured feedback, and a weekly email feedback based on the same protocol as the one described in the current study. Even with such intensive supports, few teachers in the Hemmeter et al. study were implementing the *Pyramid* with 80% fidelity at the end of coaching. The MTP web-mediated consultation project (Downer et al., 2010; Pianta et al., 2009) also provided an average of 14 web consultation sessions across the school year and found statistically significant effects on three CLASS dimensions. It is possible that given a slightly longer intervention period, we would have been able to detect stronger treatment effects.

Consistent with the findings of Pianta et al. (2008) and Powell et al. (in press), teachers accessed the distance coaching intervention differentially. To characterize participants, we categorized teachers as low- or high-participants and analyzed patterns in the data. There were more than twice as many low-participants ($n = 11$) as high-participants ($n = 5$) and several teachers in the low participation category ($n = 4$ of the 11) made no contact with the online coaching materials. This proportion of low or no participation is higher than that reported by Pianta et al. and Powell et al. The MTP web-mediated consultation project did report a 26% attrition rate in the consultation group, however (Downer et al., 2009). This is actually the same proportion of teachers who were non-participants in the current study. Perhaps the short duration of the intervention in the current study (4 months) and relatively low response cost (allow someone to film once a week) kept teachers in the study who might otherwise have withdrawn.

When level of participation in distance coaching was taken into consideration, a clear pattern emerged. Teachers with high participation in distance coaching had increases in TPOT implementation over three waves and improvements in overall classroom climate. Increases in the expected direction were seen in Teacher Sensitivity, Quality of Feedback, and Regard for Student Perspectives. There was a significant decline in classwide challenging behavior for teachers with high participation.

Access to technology was a major reason for the low participation in the current study. This topic is not frequently discussed in other reports of web-mediated professional development. Pianta et al. (2008) and Powell et al. (in press) both provided teachers with camcorders and laptop computers for use during the study. This may be a necessary accommodation to ensure full participation of teachers in many early childhood settings. The majority of teachers in the current sample did not have personal email addresses prior to beginning the study, and the Head Start program did not provide professional email accounts for the teachers. Notably, 60% ($n = 3$) of teachers in the high participation group had a personal email address prior to the study, while only one teacher in the low participation group had a personal email address. At least half of the teachers in the coaching group (across both participation levels) did not have high-speed Internet at home, and nearly all of the teachers reported difficulty accessing the videos on work computers. Despite repeated technical support visits and requests to the administration, we were unable to update the computers satisfactorily. It is commendable that so many teachers viewed the videos on their own time. Two teachers in the high participation group lived in rural settings and even went so far as to travel to their community college and public library to view the videos on the evenings and weekends. It is

possible that the response costs associated with viewing the videos was related to the low participation of the majority of the teachers.

Originally, the goal of this project was to use procedures similar to Pianta et al. (2008) and Powell et al. (in press) by asking teachers to film their own classroom practices and submit the videos to us. Because the Head Start agency was taking part in their federal review during the year this study took place, filming was an unreasonable burden on the teachers and staff. A videographer was provided by our project and visited each center once per week. Because of scheduling demands associated with the review, teachers in Cohort 1 were filmed during the same routines each week. Teachers in Cohort 2 were filmed during a variety of routines. It is unknown how the act of filming oneself (as was done in the Pianta et al. and Powell et al. studies), rather than being a passive participant of filming (as was done in the current study), may have impacted the outcomes of this study. Furthermore, it is unknown whether teachers may benefit more from focused filming of one activity or filming a variety of activities. Additional research is needed on the processes through which teachers come to reflect on their own classroom practices and how the act of videotaping influences this process.

Despite these challenges, teachers reported a high level of satisfaction with the distance coaching intervention. All teachers reported an initial fear of being filmed, but this fear subsided for most teachers as the project progressed. Integral to this comfort were two themes: (a) the knowledge that all videos were confidential and (b) the understanding that coaching was supportive rather than punitive or evaluative. This has important implications for supervision and evaluation. Teachers initially assumed their videos would be viewed by supervisors, and supervisors naturally wanted to view the videos. Human subjects guidelines prevented us from sharing videos with anyone other than the participating teacher. Teachers reported they would

not have felt comfortable had their supervisors or other teachers been able to view their videos. Respecting teachers' privacy and setting clear limits on the uses of digital media can play an important role in achieving teacher "buy-in" to these types of interventions. The tone of coaching was the second important feature of "buy-in." Based on teacher reports in previous studies in Head Start programs and other relevant research (Casey, 2008; Hemmeter et al., 2010), Head Start teachers do not receive a great deal of feedback about their classroom performance outside of supervision or evaluation. Teachers reported enjoying the email feedback and appreciated receiving ideas to try in their classrooms. This is consistent with ongoing studies of coaching around the *Teaching Pyramid* in which teachers describe the importance and value of a coach who supports rather than judges or evaluates (Hemmeter, Snyder, & Fox, in progress).

Limitations

Several important limitations affect the interpretation of the findings of this study. First, center-level effects (children within classrooms, classrooms within centers) were not taken into account in the classroom level analyses (TPOT, CLASS, and classwide challenging behavior). Due to the small sample size, the current study was underpowered, thus increasing the risk of Type II errors. Although hierarchical linear modeling or growth curve modeling would have been more appropriate analyses for classroom level data, the small sample size in the current study would have increased the risk of Type II errors. There was insufficient power to detect treatment effects with only 9 centers and 33 classrooms.

Second, as described previously, each teacher had a different level of contact with the website and email feedback. This is consistent with many other professional development studies in which relatively large groups of teachers participate (Downer et al., 2010; Pianta et al., 2009;

Powell et al., in press). This limitation prevents us from evaluating the full effects of the intervention as it was designed. The analyses of main effects are conservative estimates of treatment effects because they include all participants regardless of contact with intervention. Participants were free to access the professional development resources at their will, and the levels of access are in themselves interesting. Because all teachers in the Head Start agency were a part of the study, this sample represents “real world” conditions in the Head Start agency. As such, the results provide insight about professional development on a program-wide scale. Those responsible for providing professional development should expect various levels of engagement with the professional development program. In this study, only 30% of teachers in the distance coaching group participated meaningfully in the web-mediated intervention. Professional development providers should plan supports to increase the likelihood that all teachers will access the coaching resources they provide.

Measurement issues also limited the findings. Although the CLASS is a valid measure of teacher-child interactions, its sensitivity to change is not well established (Pianta et al., 2008). Averaging scores across cycles and dimensions makes small changes difficult to detect. Similarly, the TPOT is a relatively untested measure of implementation fidelity. It has been validated and field-tested, but it has not been used extensively in intervention studies as a measure of intervention effects. Many of its properties are still unknown. For example, it is unknown what effect the relatively frequent observations and interviews had on the data. Furthermore, the measure of classwide challenging behavior was a gross estimate of overall levels of challenging behavior in each classroom. The data were not linked to any individual children, so it is not possible to know whether any child or children had unintended influence on the data. There was no way to know from the data, for example, whether any one child was

responsible for a disproportionate number of challenging behaviors or whether the absence of a child or children was the reason for lower levels of challenging behavior.

The presence of Early Head Start classrooms in the sample also presented a measurement challenge. The infant-toddler version of the TPOT is not yet validated, so this study relied on the original TPOT, which was validated in classrooms for preschool-aged children, as the measure of implementation fidelity across all classrooms. Because most of the Early Head Start participants were at least 2 years old, we felt justified in using the TPOT in these classrooms. The CLASS has not been validated for children younger than preschool-age, so its use in these classrooms was potentially problematic. SSIS scores for children under 3 years of age were not analyzed because standard scores could not be calculated. This reduced our sample size to 24 classrooms in the HLM analysis.

The timing of measurement and the design of this study may have introduced cohort effects into the analysis. As noted in the Results section, Cohort 1 had significantly higher Wave 1 scores on the Instructional Support domain of the CLASS than Cohort 2. This may have been related to the timing of data collection for each cohort. Wave 1 data collection for Cohort 1 occurred in January 2009. Wave 1 data collection for Cohort 2 occurred in September 2009. For Cohort 1, the teachers and children were half-way through the prekindergarten year at Wave 1. For Cohort 2, the school year had just begun. Timing may also have affected SSIS scores. Teachers in Cohort 1 knew children considerably longer than did teachers in Cohort 2. Interaction patterns may have been well established in Cohort 1. For Cohort 2, it is unclear what effect the “honeymoon period” of the first few months of school may have had on SSIS ratings and their change over time. Exploratory analyses were conducted and no significant differences were found across cohorts, but the possibility of cohort effects must be recognized.

The timing of measurement may have had additional unanticipated effects on the data. A clear decrease in TPOT scores was observed between Waves 3 (March and November) and Wave 4 (April and December). Anecdotally, April and December were difficult months for data collection in Head Start programs. The programs released for the summer in mid-May, so April data collection had to be scheduled around special events and spring holidays. Similarly, the December data collection wave was difficult to schedule due to holiday programming and the winter holiday break. TPOT interviews for Cohort 2 were, on average, over 2 min shorter in December than they had been during the previous waves (data on the length of interviews are not available for Cohort 1 as those interviews were not audio recorded). Interviews contribute nearly half of the TPOT point value, so a shortened interview can have serious consequences. This study would have been strengthened by the addition of a maintenance phase or an additional data wave in the months following intervention.

Potential measurement error associated with interobserver agreement was another limitation of this study. Although the standard criterion of 80% average agreement was met (Kennedy, 2005), there were instances of agreement well below 80% on the TPOT and the classwide challenging behavior measure. Percent occurrence agreement on classwide challenging behavior was very low due to the low frequency of problem behavior in these classrooms. A potential source of agreement error is the way these two measures were collected. The TPOT and classwide challenging behavior were collected during a single observation. This required data collectors to “pause” the TPOT while they collected 10min behavior observation cycles. It is unknown what effect this may have had on overall scores and IOA scores. In other studies using these measurement systems, data from these two measures are collected on different days (Hemmeter et al., in progress).

Finally, it is unclear how the results of this study will generalize to other Head Start programs and teachers and caregivers in other early childhood programs across the country. This study took place in one Head Start agency with 33 teachers. The Head Start program had a long-standing commitment to program-wide positive behavior support. The faculty advisor on this project had provided a number of *Teaching Pyramid* trainings to teachers and area managers over the previous 4 years, and the agency had participated in several previous research projects. On average, this program had higher baseline TPOT scores than has been found in public preschool and other Head Start settings (Hemmeter et al., in progress). This indicates a foundation of supportive environments, child-centered schedules, clear expectations, and nurturing relationships. It is unclear what results would generalize to a population without such strong administrative support and experience in the *Teaching Pyramid* model.

Another issue with generalization relates to the child participants recruited in this study. On average, seven parents per class did not consent for their child to participate in the study. We have no way of knowing whether these children differed from children whose parents did consent for them to participate. In fact, we cannot be certain that the SSIS scores are representative of each classroom and center in the specific program with which we worked. This limits generalization not only to other settings and populations but also generalization within this program (to children who were not consented).

Implications for Research and Practice

This study contributes to our understanding of “why” professional development works or does not work (Sheridan et al., 2009). Our inability to reject the null hypothesis that a main effect for distance coaching exists is an important finding. The null finding, coupled with promising

data from teachers with the highest levels of participation in distance coaching, open up promising lines of inquiry around why the professional development intervention worked for some teachers and not for others. The findings are interesting based on three considerations: (a) the duration of the intervention relative to other studies, (b) the variability in participation in the coaching intervention, and (c) the supports necessary to sustain professional development.

As described previously, this intervention lasted half as long as similar coaching studies on social-emotional practices (Hemmeter et al., in progress; Pianta et al., 2008). Future research should investigate whether there is a “critical threshold” in terms of number of sessions needed for coaching to produce an effect. Based on Hemmeter et al. (in progress) and Pianta et al. (2008), it would seem that 12 - 14 sessions are minimal for detecting changes in teacher and child outcomes when improved quality of interactions is the goal. Several other studies have provided more intense classroom support with positive results. Raver et al. (2008) and Domitrovich et al. (2009) offered 3 – 4 hours per week of in-classroom mental health consultation and curriculum-based mentoring, respectively. Raver et al. described this time as necessary for offering teachers “stress relief” and breaking negative interaction cycles around challenging behavior. Future research should investigate the temporal dimensions of effective follow-up; duration, frequency, and consistency of follow-up may all affect outcomes.

Furthermore, it might be important to understand whether and to what extent the content focus of coaching (e.g., responding to challenging behavior, teaching social skills, teaching literacy skills) impacts the frequency or duration of coaching that is needed to observe change in teacher practice. For instance, several examples in the literature show short, focused feedback interventions can have strong effects on discrete classroom practices (e.g., Hendrickson et al., 1996; Noell et al., 2005; Stormont et al., 2007). Perhaps certain content areas or certain classes

of teacher behaviors are amenable to short focused in-classroom support while others require ongoing, systematic support. Future research should attempt to describe whether certain types of support are most appropriate for certain target behaviors.

Variability in accessing the web-mediated coaching materials was perhaps the most interesting finding of this study. It will be important for educational researchers to identify the characteristics of teachers that make them more or less likely to participate in professional development experiences. Interactions between teacher characteristics and specific modes of professional development delivery will be important to identify. For instance, in the current study, at least one teacher never accessed the video clips because she did not want to see herself on film. She said at the focus group, “I know what I look like, and I didn’t want to see it.” Perhaps starting with a face-to-face coaching relationship might have changed this teacher’s attitude towards watching her videos. Alternatively, she may find viewing herself unacceptable under any circumstances. The experiences of two other teachers highlight an important finding of this study. The two highest participators in coaching came from the same Head Start center in Cohort 1. These teachers had previous experience with the investigator (the highest participator had received email feedback from the investigator in the past; Hemmeter et al., 2010). Despite initial vocal resistance to the idea of filming, these two teachers viewed nearly every clip and responded to a large proportion of emails. Anecdotally, one of these women corresponded with the investigator for additional resources nearly a year after completing the Hemmeter et al. (2010) study and shortly after completing her participation in the current study. It is impossible to know the extent to which the previous relationship and experiences with the research team impacted these teachers’ willingness to participate. The success of these teachers, however, highlights the critical role of relationships in coaching.

Time to build trust and develop shared goals is an important component of coaching (Neuman & Cunningham, 2008; Sheridan, 2009). The next step in coaching research should be to determine the processes necessary for building this relationship between individuals at a distance. In the current study and other studies identified as providing web-mediated professional development (Pianta et al., 2009; Powell et al., in press), teachers and coaches were both involved in a live training. Future research should investigate whether this live interaction between teacher and coach is a critical foundation to the coaching process and how much live interaction is ideal. Future research should also examine the role of “real time” communication between teachers and coaches. Incorporating real-time video chats (Pianta et al., 2009) and other forms of synchronous communication could be important elements of future research. Additionally, the supports necessary to sustain these increasingly complex professional development strategies must be considered. The need for technical support and equipment has already been discussed. The importance of “ready to use” web-mediated content cannot be underestimated. This study would have been much improved if all teachers could have accessed their videos on the first try in a location that was convenient for them.

Unrelated to technology, teachers in the distance coaching group also reported a desire for additional booster sessions, group meetings, or hands-on experiences to talk about how others were implementing materials. This is an interesting finding given the results of Rusby et al. (2008), Slider et al. (2006), and Webster-Stratton et al. (2001). These studies offered no in-classroom support. Instead teachers participated in a series of group training workshops. Raver et al. (2008) and Webster-Stratton et al. (2008) also offered planned booster sessions throughout the intervention in addition to coaching. Raver et al. reported 75% of participants gave up their

Saturdays to come to group training sessions. Perhaps booster sessions would provide an efficient and effective face-to-face addition to web-mediated coaching.

Finally, the provision of classroom materials seemed to be an important part of the professional development intervention in the current study. Every teacher in the high participation group requested additional classroom materials from the investigator. Only three of eleven teachers in the low participation group requested materials. Every teacher had the opportunity to request these materials, but only a small group did. It is unclear what role these materials played. Perhaps teachers who requested materials were more interested and “bought in” at the beginning, or perhaps these teachers felt some connection or obligation to the coach as a result of requesting these materials. Although it cannot be determined from the present study what role materials played in the coaching process, it seems that offering materials helped develop a relationship between the teacher and coach. To provide materials, a series of interactions had to take place between the teacher and coach: conversations about the materials, brainstorming, and delivery. At each stage in this process, the coach had a chance to talk with the teacher about her classroom and *Pyramid* implementation. In another study on coaching teachers around the *Teaching Pyramid* (Hemmeter et al., in progress), the provision of classroom materials has been an important part of the ongoing coaching process and integral to helping teachers use recommended practices in their classroom.

The current study offered a demonstration of web-mediated professional development around an intervention designed to promote social skills and prevent and address challenging behavior. Despite limited main effects, this study provided preliminary information on the intensity of coaching that might be needed to observe changes in classroom practice. First, this study demonstrated that training alone does not appear to be sufficient to change teachers’

implementation of *Teaching Pyramid* practices (Fixen, Naoom, Blase, Friedman, & Wallace, 2005; Guskey, 2000). Despite an interactive training in which teachers developed action plans, received implementation guides, and received classroom materials, there were no statistically significant effects on *Teaching Pyramid* implementation, classwide challenging behavior, or overall classroom quality for teachers in the training only group. Second, this study helped us begin to understand dosage issues related to professional development. Relative to levels of professional development in other studies (Domitrovich et al., 2009; Hemmeter et al., in progress; Pianta et al., 2009; Raver et al., 2008), this intervention was brief and required relatively little effort on the part of the teacher. The minimal effects found in this study lend support to the claim that professional development should be coherent (Winton, 2006); it should offer long-term, systematic support linked directly to child outcomes, learning standards, and organizational systems change. Future studies should evaluate the effects of different intensities of coaching and support necessary for change in the practice context. Finally, this study evaluated the effects of feedback delivered via email. Because email is an asynchronous mode of communication and could not be viewed simultaneously with the videos, the connection between the email feedback and the edited video may not have been clear to each teacher. Future research should examine whether “real time” feedback—such as annotated videos or voiceover narration—is a more effective way to provide feedback to teachers.

Given the financial and personnel resources devoted each year to early childhood professional development, the findings from the current study can inform future professional development efforts. Technology has promising applications for delivering cost-effective, individualized coaching and support. The challenge for the field will be threefold. First, access must be improved. This study and others (e.g., Powell et al., in press) show many Head Start

programs do not yet have consistent access to modern computers and high speed internet connections. Web-based resources are meaningless if they cannot be accessed or they can't be accessed efficiently. Second, once access is ensured, the characteristics that make individuals more or less likely to use technology-driven professional development should be explored. Barriers such as fear, lack of time, and lack of experience with technology can be overcome through careful planning and systematic support. Finally, the field should consider integrated professional development systems that merge individualized web-mediated supports with other efficient and effective "hands on" approaches such as small group booster trainings, peer study groups, or live coaching. Hybrid models in which live coaching and distance coaching are intermixed, or perhaps offered as a professional development "menu" based on individual teacher needs or preferences, could offer promising cost-effective alternatives to traditional professional development.

There is little doubt that technology will impact the way professional development is applied in early childhood settings in the future. Technology can bring exciting, high quality professional development opportunities to even the most remote areas of the country. There is still much work to be done, however, as we consider how to deliver meaningful content to teachers from a variety of backgrounds and experiences. Technology is one tool among many. No matter the form professional development takes, it will be important to keep in mind the real criterion by which we judge the value of professional development: improved outcomes for teachers and children.

Appendix A
Sample Action Plan

Goal	Action Steps	Materials or Resources Needed	Timeline	My goal is met when...	Date Action Step Completed
<p>2. Create and post a visual schedule, teach the schedule to the children, and refer to it throughout the day.</p>	<p>2a. List the parts of a typical classroom day.</p> <p>2b. Decide what format the pictures should be (Boardmaker, photo) and the size of the schedule pieces.</p> <p>2c. Post the schedule under the class dry-erase board (going left to right)</p> <p>2d. Teach the schedule in large group time by showing them the schedule, modeling its use, and reminding them to check it themselves.</p> <p>2e. Refer children to the schedule when an unusual event is about to occur (use the “Special Activity” card)</p>	<p>Create schedule pieces for:</p> <ul style="list-style-type: none"> • Circle Time (Morning Meeting, Story options as well) • Table Time • Small Groups • Centers • Group • Lunch • Music & Movement • Recess/ Gym • Rest • Snack • Dismissal • Special Activity <p>Velcro on front and back Save to MS Word and burn to CD</p>	<p>Post by 11/3 and introduce to children. Due to absences and school cancellations, plan to implement fully during week of Nov 10.</p>	<p>I have posted the schedule in my classroom.</p> <p>I review the schedule during most routines. I “flip” the schedule piece to let the children know that routine is finished.</p> <p>I encourage children to “check the schedule” when they seem confused or off-task.</p> <p>I use the special activity cards to prepare children for an unusual or special event (assembly, field trip, birthday, playing in the gym instead of the playground).</p>	

Notes:

Goal	Action Steps	Materials or Resources Needed	Timeline	My goal is met when...	Date Action Step Completed
<p>1. Teach children to take turns at high-interest centers (computers)</p>	<ol style="list-style-type: none"> 1. Create a Turn-Taking Board with children's pictures. 2. Place timers at the computer table. 3. Teach children to place their names/ pictures on the list when they want a turn at the computer or other high-interest center. 4. Teach children to turn on the timer as soon as they sit down at the computer. Set timer for reasonable amount of time (5-10min??). 5. Focus on the vocabulary, "_____'s turn." And "First ___'s turn. Then ___'s turn." 6. Praise children for their patience, for using the system, for taking turns 	<p>Turn-taking board with children's pictures.</p> <p>Digital photos of children and list of names.</p> <p>Velcro, laminated</p>	<p>Will prepare picture name cards within one week of taking digital pictures.</p> <p>Begin implementing as soon as materials are ready.</p>	<p>Turn-taking boards are displayed.</p> <p>I have taught the children to use the board during Center time. I introduced the board to the group, and I review the board one-on-one with children during Centers.</p> <p>Children put names on the turn-taking board with minimal prompting.</p> <p>Children set timers with minimal prompting.</p>	

Appendix B
Email Feedback Protocol

Coach ID: _____ Teacher ID: _____ Date: _____

Elements of Feedback: Check if present in email	Check:
1. Opening Comment	
Begin with general, positive statement about what you observed. <i>Examples: "Thanks for letting me sit in; it was good to see you in action again." "I saw you implement some important features of descriptive praise."</i>	
2. Supportive Feedback	
Provide supportive feedback for (a) teachers' complete and correct examples of descriptive praise or (b) generally positive aspects of teacher's behavior. AND includes the number of descriptive praise statements used during the observation. <i>Examples: "You made 15 positive descriptive feedback statements during the time I observed you in class today." "Wonderful to watch; for example, when you used (praise/ feedback) for (child) when s/he (behavior)." OR "Several of the descriptive praise examples I saw were very well done." OR "Your enthusiasm is easy to appreciate."</i>	
3. Corrective Feedback	
Mention our striving for implementation fidelity <i>Example: "We can draw on research and lessons from classrooms for examples of refined EI practices." "It's important that we incorporate all elements of descriptive praise for maximum effectiveness."</i>	
Mention your constructive intent <i>Example: "My e-mail feedback involves noting a point or two that might be improved to help you learn how to use descriptive praise more efficiently or effectively."</i>	
Describe one or two examples of descriptive praise done incorrectly <i>Example: "When you did (an element of descriptive praise) with (child) you did this well, but missed the mark when you failed to do (this portion)."</i>	
4. Planned Actions	
Follow-Up Actions for Teacher: Ask teacher to review materials; provide a web link to a video model of skill; ask teacher to develop a plan for when she might praise <i>Example: "I'd like for you to take a look at this short video clip and think about how you might have used descriptive praise in the situation above. Please click the link below."</i>	
Pose a scheduling question about the next visit <i>Example: "Can I plan to observe again on Monday?" "When would be a good time for my next visit?"</i>	
Ask for a reply via e-mail <i>Example: "Please write back to confirm my next visit."</i>	
Link to future: <i>Examples: "Could I share your strategy with other teachers?" "Would you mind if I used the activity you did today?"</i>	
5. Closing Comments	
Close with general, positive and encouragement statement <i>Examples: "It's always a pleasure to visit your classroom; I always come away with more ideas about ____." "Thanks again for being part of this project."</i>	

Appendix C
Sample Email Feedback Message

Hi Heather,

1. Positive opening comment

Thanks for letting us film this week! I always enjoy watching your activities.

I was so impressed with the way you encouraged friendship skills this week. I heard you encourage the children to share, take turns, help each other, and work together. I thought it was very cute the way the children responded. One girl said, "We're sharing!" This all seemed like a really natural part of your activity. It was great! One strategy I heard you use was especially great: you used a lot of descriptive praise this week to recognize the children's friendship skills (Examples: "I like the way you are sharing", "You worked together!", "Thank you for helping me.") This is like a "two for one": you get an opportunity to talk about social skills and the children get really positive attention.

2. Supportive performance feedback

My goal each week is to put on my "social emotional lenses" and look for opportunities to talk about friendship skills or other Teaching Pyramid strategies. I had a hard time this week because I really think you are doing an amazing job finding opportunities to talk about emotions and friendship skills. I did notice it seemed like your kids had some interesting behaviors this week...did it feel that way to you? I didn't notice anything unusual, just little ones learning to interact. You know me, though, I like to brainstorm ideas. In general, do you see more behaviors towards the end of group time (versus the beginning)? I know you have a new little guy who can't be filmed. (The images are blurred or completely edited out when he enters the frame). Do you think your whole class could be going through a bit of a social transition as the kids get older and a new child enters the mix? I'm attaching a nice article I found about transitions for little ones. It has some nice ideas to think about and/or share with families when you get a new child. Another strategy might be to make sure group time is under 10 minutes. The kids love your attention so much, but it's hard to share your attention during large group. Plus, there's no shame in stopping group early!

3. Constructive intent and corrective feedback with ideas or suggestions

I can't believe it's almost the middle of November. The data collectors will be out to your room on the 17th. I'll also come by that afternoon to pick up your bubble sheet for the monthly interview. Does that sound ok? We're on the home stretch!!

4. Planned action with embedded

Could you write back to let me know you got this and all is well for data collection?

5. Closing encouragement statement

Thanks again for being a part of this project. I enjoy watching your room so much!

Kathleen

Appendix D
Teaching Pyramid Training Protocol
Two Day Training

Date of Training: _____

Location of Training : _____

Trainers' Names: _____

Fidelity Observer: _____

Pyramid Level	Planned Activity	Observed	
		Yes	No
Overview	Activity to Introduce Participants		
	Review agenda and purpose for three days		
	Show overview video and provide an overview of the Pyramid		
Relationships	Introduce checklist of skills		
	Have participants rate themselves on skills		
	Introduce Implementation Guide		
	Present information on relationships		
	Have participants plan what they will work on and what supports they will need		
Environments	Introduce checklist of skills		
	Have participants rate themselves on skills		
	Introduce Implementation Guide		
	Present information on physical environments		
	Present information on schedules and routines		
	Present information on transitions		
Pyramid Level	Planned Activity	Observed	
		Yes	No
Environments continued	Present information on expectations and rules		
	Have participants plan what they will work on and what supports		

	they will need		
	Introduce and give out material kits		
Social Emotional Teaching Strategies	Introduce checklist of skills		
	Have participants rate themselves on skills		
	Introduce Implementation Guide		
	Show social skills teaching video		
	Present information on what to teach		
	Present information on when to teach		
	Present information on teaching friendship skills		
	Present information on teaching emotional literacy		
	Present information on teaching anger management		
	Present information on teaching problem solving		
	Have participants plan what they will work on and what supports they will need		
	Introduce and give out material kits		
General Strategies	Agenda was followed		
	At least one activity was conducted in morning and afternoon of each day		
	Opportunities for participants to ask questions were provided throughout the training		

Appendix E
Action Plan Protocol

Teacher ID: _____

Coach ID: _____

ID of second reader: _____

Date: _____

	Step	Present	
1	At least 3 goals are listed	Y	N
2	The goals are observable and measurable	Y	N
3	Each goal is broken down into at least 2 action steps	Y	N
4	The action steps are observable and measurable	Y	N
5	The resources necessary for achieving each action step are listed	Y	N
6	A date is set for initiating OR completing each action step	Y	N
7	The criteria for meeting the goal are listed	Y	N
8	The time of day when the teacher will film is listed for each goal.	Y	N

Appendix F
Classroom Demographic Questionnaire

Classroom Profile
<p>1. What is the highest degree you have earned? Please check one.</p> <p><input type="checkbox"/> Some high school</p> <p><input type="checkbox"/> High school diploma</p> <p><input type="checkbox"/> Some college</p> <p><input type="checkbox"/> Child Development Associates (CDA)</p> <p><input type="checkbox"/> Associates Degree</p> <p><input type="checkbox"/> Bachelors Degree</p> <p><input type="checkbox"/> Masters Degree</p> <p><input type="checkbox"/> Other (please describe)</p>
<p>2. What is your degree or certification in (if applicable)? Please check one.</p> <p><input type="checkbox"/> Not applicable (no certification or degree)</p> <p><input type="checkbox"/> Child Development Associates (CDA)</p> <p><input type="checkbox"/> Early Childhood Education/ Child Development</p> <p><input type="checkbox"/> Early Childhood Special Education</p> <p><input type="checkbox"/> Other (please describe)</p>
<p>3. How long have you been in a paid teaching position?</p>
<p>4. How long have you worked in your current job?</p>
<p>5. About how many hours of training (e.g. workshops) do you receive each year as a part of your job?</p>
<p>6. Have you ever received training in challenging behavior or social-emotional development? If so, please describe.</p>
<p>7. How many adults work in your classroom full time? _____ Part time? _____</p>
<p>8. How many children are in your classroom?</p>
<p>9. What is the age range of children in your class?</p>
<p>10. How many children are boys? _____ girls? _____</p>
<p>11. About how many children are:</p> <p><input type="checkbox"/> African American</p> <p><input type="checkbox"/> American Indian/ Alaskan Native</p> <p><input type="checkbox"/> Asian/ Pacific Islander</p> <p><input type="checkbox"/> Hispanic</p> <p><input type="checkbox"/> White, not Hispanic</p> <p><input type="checkbox"/> Other</p>
<p>12. How many children in your class have Individualized Education Plans (IEPs)?</p>
<p>13. How many children in your class are English Language Learners (ELL)?</p>

14. How many children in your class have persistent, ongoing challenging behavior that disrupts other children or activities?

15. What related services, if any, do your students receive? Please check all that apply.

Speech and Language Services

Occupational Therapy

Physical Therapy

Other

Appendix G
Center Profile

How strongly do you agree or disagree with each of the following statements?

(1) Disagree Strongly (2) Disagree (3) Uncertain (4) Agree (5) Agree Strongly

1. You have the basic computer equipment/programs you need.
2. Computer problems are usually repaired promptly.
3. Your computer equipment is mostly old and outdated.
4. Staff are satisfied with the computer system here.
5. More computers are needed for staff to use.
6. You have easy access for using the internet at work.
7. Policies here limit staff access to the internet and use of e-mail.
8. You have convenient access to e-mail communications.
9. You need better access while at work to resources on the Internet.
10. Staff here feel comfortable using computers.
11. More computers are needed in this program for staff to use.

12. Staff here have the skills they need to do their jobs.
13. More support staff are needed for getting tasks completed.
14. Frequent staff turnover here is a problem.
15. Staff here usually have enough time to complete assigned duties.
16. There are enough staff here to meet organizational needs.
17. Staff here are qualified for their duties.

18. Staff training and continuing education are priorities here.
19. The budget here allows staff to attend professional conferences each year.
20. You receive regular inservice training here.
21. The workload and pressures here keep motivation for new training low.

22. Staff here all get along very well.
23. There is too much friction among staff members.
24. The staff here work together effectively as a team.
25. Staff here are always quick to help one another when needed.
26. Mutual trust and cooperation among staff here are strong.
27. Some staff members do not do their fair share of work.
28. Some staff members here resist any type of change
29. You have staff meetings weekly.
30. Staff members think they have too many rules here.
31. The general attitude here is to use new and changing technology.
32. Your staff regularly follows your leadership.

33. Too many staff decisions have to be reviewed by someone else.
34. Ideas or suggestions from staff get a fair hearing from management.
35. The formal and informal communication channels here work fine.
36. More open discussions about issues would be helpful.

37. The staff here shows signs of stress and strain.
38. The heavy workload reduces staff effectiveness.
39. Staff frustration is common here.
40. Novel ideas by staff are discouraged here.
41. It is easy to change routine procedures to meet new conditions.
42. You frequently hear good staff ideas for improving operations.
43. The general attitude here is to change things that aren't working.
44. You are encouraged here to try new and different ideas.
45. Staff concerns are ignored in most decisions.
46. You have confidence in how decisions are made here.

Appendix H

Teaching Pyramid Observation Tool (TPOT)

Data ID Code: _____

Date: _____ Start time: _____ End time: _____

Activities observed: _____ # of Children ____ and Adults ____ in classroom at time of observation

Teaching Pyramid Observation Tool for Preschool Classrooms (TPOT) Research Edition

Mary Louise Hemmeter, Lise Fox, and Patricia Snyder

The *Teaching Pyramid Observation Tool for Preschool Classrooms* (TPOT) provides a tool for assessing the fidelity of implementation of the *Teaching Pyramid* model. Items on the checklist serve as indicators that teaching practices associated with each component of the intervention are in place. The TPOT is completed during an observation of a preschool classroom and after an interview with the teacher. To conduct the observation, the lead teacher should be identified. Generally, items should be scored based on the behavior of all adults in the classroom. However, when there is a discrepancy between behavior of the lead teacher and the behavior of other staff, the item should be scored based on the lead teacher's behavior (e.g., if the lead teacher's tone in conversations with children is primarily negative and the assistant's tone is positive, you would score the item based on the lead teacher's behavior). The observation should last at least 2 hours and include observation of at least one teacher-directed group activity and centers or a free play activity. The TPOT includes three types of items: (1) items that require a yes/no response based on the observation (1-7), (2) items that require a rating based on the observation and teacher interviews (8-18), and (3) items that are scored based on responses given by the teacher who is observed (19-22). The following table shows the practices associated with the *Teaching Pyramid* and the items on the TPOT that address those practices.

To most effectively answer item 10.5.4, if the observer is not familiar with the classroom he or she should ask the teacher the following questions and record the responses PRIOR TO THE OBSERVATION:

- "Are there any children present today who are unable to communicate with you in the same way as other children in the class because they have a severe language delay?" check : YES NO
- "Are there any children present today who need information presented to them in a different way because they are English Language Learners?" check : YES NO

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Data ID Code: _____

Level	Component	Practices	TPOT Items
Universal	Responsive Interactions	Supporting children's play; Responding to child conversations; Support communication of children with special needs; Positive feedback and encouragement of appropriate behavior; Build relationships with children	10, 13,14, 20, 22, 25, 28, 29, 30, 32, 36, 37, 38
Universal	Classroom Preventive Practices	Adequate materials; Defined play centers; Balanced schedule (large & small group); Structured transitions; Individualized instructions for children who need support; Teach and promote small number of rules; Design activities that are engaging to children; Provide clear directions	1, 2, 3, 4, 6, 7, 8, 9, 11,12, 23, 24, 26, 27
Secondary	Social Emotional Teaching Strategies	Teach children to identify and express emotions; Teach and support self-regulation; Teach and support strategies for handling anger and disappointment; Teach and support social problem solving; Teach and support cooperative responding; Teach and support friendship skills; Teach and support collaboration with peers	15, 16, 17, 18, 31, 33, 34
Targeted	Individualized Interventions	Convene a team to develop interventions; Collect data to determine nature of problem behavior; Develop individualized behavior support strategies; Implement behavior support plan with consistency; Conduct ongoing monitoring of child progress; Revise plan as needed; Partner with families and colleagues in plan implementation	19, 21, 35

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Data ID Code: _____

Circle "Yes" if element is in place and circle "No" if element is not in place.

1. Learning centers have clear boundaries (physical)	Yes	No
2. The classroom is arranged such that all children in the classroom can move easily around the room	Yes	No
3. The classroom is arranged such that there are no large, wide open spaces where children could run	Yes	No
4. There is an adequate number and variety of centers of interest to children and to support the number of children (at least 4 centers; 1 center per every 4 children)	Yes	No
5. Materials in all centers are adequate to support the number of children allowed to play	Yes	No
6. Materials/centers are prepared before children arrive at the center or activity	Yes	No
7. Classroom rules or program-wide expectations are posted, illustrated with a picture or photo of each rule or expectation, limited in number (3-5), and stated positively (all have to be true to score a "yes")	Yes	No

Observation Instructions:

During your observation, mark the presence or absence of all indicators by checking "y" for yes or "n" for no. Also, on items that can be scored from either observation or teacher report, check "O" if it was scored based on observation and "R" if it was scored based on teacher report. Once you have completed your observation, you will score an item as follows: If a teacher does not get all the items under a "1," they receive a score of 0. If the teacher gets all of the behaviors under a "1" but none of the behaviors under a "3," they receive a score of "1." If they demonstrate all of "1" and only some of "3," they receive a score of "2." If they receive all of "1" and all of "3" but none of "5," they get a score of "3." If they get all of "1," "3," and some of "5," they receive a score of "4." In order to receive a score of "5," they have to demonstrate all skills across all indicators.

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8. Schedules and routines

0	1	2	3	4	5
A classroom receives a score of "0" if all behaviors under a score of "1" are not observed	__Y __N (1.1)Teacher posts classroom schedule with visuals so that children are aware of the activity sequence of the day *		__Y __N (3.1)Teacher reviews the schedule with children and refers to it throughout the day*		__Y __N (5.1)Teacher only continues with a specific teacher-directed activity when the majority of children are actively engaged and interested.*
	__Y __N (1.2)Teacher-directed activities are shorter than 20 minutes*		__Y __N (3.2)Teacher structures routines so that there is a clear beginning, middle, and end *		__Y __N (5.2)Individual children who need extra support are prepared for activities using an activity schedule or cues at the beginning of activities*
	__Y __N (1.3)There are both large- and small-group activities		__Y __N (3.3)There is a balance of child-directed and teacher-directed activities*	__Y __N (3.4)If needed, teacher prepares children when changes are going to occur within the schedule (score N/O if no opportunity to observe)* __N/O	
			<i>If 3.1 is scored N, this item must also be scored N.</i>		

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9. Transitions between activities are appropriate

0	1	2	3	4	5
A classroom receives a score of "0" if all behaviors under a score of "1" are not observed	<p>__Y __N (1.1)Teacher structures children's transitions*</p> <p>__Y __N (1.2)A whole-class warning is provided prior to transition*</p>		<p>__Y __N (3.1)Teacher has transition strategies that ensure children are actively engaged in the transition*</p> <p>__Y __N (3.2)Teacher explicitly teaches children the steps and expectations of transitions*</p> <p>__Y __N (3.3)Direct warnings are provided to individual children who may have difficulty prior to transitions*</p> <p>__Y __N (3.4)Teacher provides positive, descriptive feedback children who engage in the transition appropriately*</p>		<p>__Y __N (5.1)Teacher effectively guides individual children who need extra support during the transitions*</p> <p>__Y __N (5.2)During transitions, all children are actively engaged, including children who are waiting for the next activity</p>

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10. Teachers engage in supportive conversations with children

0	1	2	3	4	5
A classroom receives a score of "0" if all behaviors under a score of "1" are not observed	__Y __N (1.1)Teacher acknowledges children's communication to him/her*		__Y __N (3.1)Teacher has brief conversations with children*		__Y __N (5.1)Teacher <u>responds</u> to children's comments and ideas by asking questions, making comments
	__Y __N (1.2)Teachers greet/call most children by name during the day		__Y __N (3.2)Teacher occasionally joins in children's play to support their interactions		__Y __N (5.2)Teacher joins in children's play to support their interactions and expand their ideas
			__Y __N (3.3)Teacher's tone in conversations with children is generally positive, calm, and supportive		__Y __N (5.3)Teacher has extended comfortable and positive conversations with children during routines and activities about their interests and ideas
			__Y __N (3.4)Throughout the observation, the teacher uses descriptive praise for children's skills, behaviors, and activities*		__Y __N (5.4)Teacher uses alternative strategies when communicating with children who are nonverbal, language delayed, or English language learners (score N/O only if no children requiring these supports are in attendance)*

Notes:

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11. Promoting children's engagement

0	1	2	3	4	5
A classroom receives a score of "0" if all behaviors under a score of "1" are not observed	<input type="checkbox"/> _Y <input type="checkbox"/> _N (1.1) Teacher offers general guidance to children to select activities or use materials to promote engagement*		<input type="checkbox"/> _Y <input type="checkbox"/> _N (3.1) Structured large-group (e.g., circle) activities are structured so that children are actively engaged (responding, interacting) almost all of the time		<input type="checkbox"/> _Y <input type="checkbox"/> _N (5.1) Teacher assists individual children who are exhibiting problem behavior within an activity become actively engaged (score N/O if no opportunity to observe) *
	<input type="checkbox"/> _Y <input type="checkbox"/> _N (1.2) Teacher provides fun activities that will support the engagement of almost all of the class *		<input type="checkbox"/> _Y <input type="checkbox"/> _N (3.2) Teacher assists individual children in selecting center activities and becoming actively engaged*		<input type="checkbox"/> _Y <input type="checkbox"/> _N (5.2) Teacher modifies instruction or activity when children lose interest in large- and small-group activities
	<input type="checkbox"/> _Y <input type="checkbox"/> _N (1.3) Teacher communicates with children on eye level almost all of the time *		<input type="checkbox"/> _Y <input type="checkbox"/> _N (3.3) Children are provided with multiple opportunities to make meaningful choices within activities (choosing center, choosing how to use materials, choosing where to sit, etc.)		
			<input type="checkbox"/> _Y <input type="checkbox"/> _N (3.4) Teacher frequently comments positively on children who are engaged in activities		

Notes:

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12. Teaching children behavior expectations (i.e., posted classroom rules or program wide expectations) (score a 0 if no expectations are posted)

0	1	2	3	4	6
A classroom receives a score of "0" if all behaviors under a score of "1" are not observed	__Y __N (1.1) Posted behavior expectations are reviewed with children during large-group activities*		__Y __N (3.1) When problem behavior occurs, the child is reminded of posted behavior expectations* <i>If 1.2 is scored N, this item <u>must</u> also be scored N.</i>		__Y __N (5.1) Throughout the observation, teacher provides specific positive feedback to children on meeting posted behavior expectations
	__Y __N (1.2) Children are reminded of posted behavior expectations *		__Y __N (3.2) Teacher provides instruction or reminders on posted behavior expectations to individual children, during play, and within small-group activities*		__Y __N (5.2) Teacher facilitates discussions where children are involved in critically thinking about behavior expectations and their importance in the classroom*
			__Y __N (3.3) Teacher comments on appropriate child behavior, linking the behavior to the classroom expectations		

Notes:

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13. Providing directions

0	1	2	3	4	5
A classroom receives a score of "0" if all behaviors under a score of "1" are not observed	<input type="checkbox"/> _Y <input type="checkbox"/> _N (1.1) Teacher uses directions that are simple, short, and specific		<input type="checkbox"/> _Y <input type="checkbox"/> _N (3.1) Teacher consistently provides positive, descriptive praise to children who follow the directions*		<input type="checkbox"/> _Y <input type="checkbox"/> _N (5.1) Teacher checks in with children to make sure they understand the directions*
	<input type="checkbox"/> _Y <input type="checkbox"/> _N (1.2) Teacher uses directions that tell children what to do rather than what not to do		<input type="checkbox"/> _Y <input type="checkbox"/> _N (3.2) Teacher redirects children who are withdrawn, distracted, or off task to more productive activities.*		<input type="checkbox"/> _Y <input type="checkbox"/> _N (5.2) Teacher individualizes directions for children who need more support (e.g., additional prompt, nonverbal prompt along with verbal direction, picture prompts) *

Notes:

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14. Using effective strategies to respond to problem behavior

Challenging behavior was observed: Yes or No

If no challenging behaviors are observed, check No above and do not score any indicators in item 14 EXCEPT for indicator 5.1. If any challenging behaviors are observed, check Yes above and score *all* indicators in item 14.

Challenging behavior includes (a) physical aggression such as hitting, kicking, punching, spitting, throwing objects forcefully, pinching, pushing, and biting, (b) not following directions – this should be more than an occasional event, (c) running in the classroom, hallways, or other areas not designed for running, (d) climbing on things in the building, (e) destroying property, destroying what another child is working on (f) taking toys away from other children forcefully, (g) running out of the room, (h) tantrum behaviors including head banging, (i) disruptive behaviors in a group such as talking out, leaving the group activity, not following directions repeatedly, (j) verbal aggression including yelling, screaming, calling children names, and saying bad words, (k) stereotypic behaviors, (l) persistent or prolonged crying that is loud or disruptive

0	1	2	3	4	5
A classroom receives a score of "0" if all behaviors under a score of "1" are not observed	<input type="checkbox"/> _Y <input type="checkbox"/> _N (1.1) Teacher implements developmentally appropriate generic strategies (i.e., time-out, redirection) in response to problem behavior that occurs		<input type="checkbox"/> _Y <input type="checkbox"/> _N (3.1) Teacher directs children toward a desired alternative behavior.		<input type="checkbox"/> _Y <input type="checkbox"/> _N (5.1) Teacher frequently comments on children's appropriate behavior
	<input type="checkbox"/> _Y <input type="checkbox"/> _N (1.2) Children are told the expected behavior in positive terms (i.e., what to do) when engaging in problem behavior		<input type="checkbox"/> _Y <input type="checkbox"/> _N (3.2) Teacher ignores behaviors when appropriate (e.g., behaviors that are not harmful to child or others)*		<input type="checkbox"/> _Y <input type="checkbox"/> _N (5.2) Teacher provides support to children who are angry or upset by assisting them with problem solving
	<input type="checkbox"/> _Y <input type="checkbox"/> _N (1.3) Teacher states and follows through with stated consequences when children persist in problem behavior *		<input type="checkbox"/> _Y <input type="checkbox"/> _N (3.3) Teacher responds to problem behavior by using it as a chance to teach an acceptable alternative		<input type="checkbox"/> _Y <input type="checkbox"/> _N (5.3) Teacher provides positive attention to the child when the child begins behaving appropriately*
			<input type="checkbox"/> _Y <input type="checkbox"/> _N (3.4) Teacher uses logical and natural consequences to redirect children to use appropriate behavior *		

Notes:

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15. Teaching social skills and emotional competencies -General

0	1	2	3	4	5
A classroom receives a score of "0" if all behaviors under a score of "1" are not observed	<p>__Y __N (1.1) Teacher uses naturally occurring opportunities across the day to teach social and emotional skills</p> <p>__Y __N (1.2) Teacher structures activities or opportunities for children to work together (this should be intentional—for example, "choose a friend to read a book with")</p>		<p>__Y __N (3.1) Teacher uses a variety of strategies to help children learn the concept associated with specific skills. Examples of strategies are: discussion, role play, and describing observations of children in the classroom who demonstrated the skill *</p> <p>__Y __N (3.2) Teacher uses small- or large-group settings to teach social skills and emotional competencies (e.g., friendship skills, problem solving, emotional literacy) *</p> <p>__Y __N (3.3) Teacher models expected social skills and emotional behaviors while describing his/her behavior *</p> <p>__Y __N (3.4) Teacher comments positively and descriptively on children who are using social skills or expressing their emotions in appropriate ways</p>		<p>__Y __N (5.1) Teacher helps children review their use of the skill either individually or in groups</p> <p>__Y __N (5.2) Teacher individualizes instruction of social skills (e.g., one-on-one instruction as needed, different prompting strategies) based on children's developmental needs. Procedures and materials vary across children *</p>

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It is reasonable to expect that teachers may not intentionally teach all of the following skills on the day you are observing. If you do not observe specific instruction on the skills in items 16-18, ask the questions following each item and use the answers to rate the specific item. Ask the teacher to be as specific as possible throughout the interview. Indicate if the item was observed (O) or reported (R) by the teacher:

***Note:** If you observe a behavior that conflicts with teacher report, make scoring decisions based on observation.

16. Teaching children to express emotions

- Tell me how you teach or help children recognize and deal with emotions. Give me some examples of the range of emotions you teach or help children learn. What strategies do you use? What materials do you use? (item 16)
- Tell me how you teach or help children deal with their anger. What strategies do you use? What materials do you use? (item 16)
- How do you individualize instruction around emotions? Can you give me a few examples? (item 16)

0	1	2	3	4	5
A classroom receives a score of "0" if all behaviors under a score of "1" are not observed	<input type="checkbox"/> _Y <input type="checkbox"/> _N (1.1) Teacher models or labels own emotions or appropriate ways to express emotions		<input type="checkbox"/> _Y <input type="checkbox"/> _N (3.1) Teacher uses a variety of strategies to teach children how to recognize emotions in themselves, other children, or adults*		<input type="checkbox"/> _Y <input type="checkbox"/> _N (3.1)Teacher uses a variety of strategies to teach children how to respond to other children's emotions
	<input type="checkbox"/> _Y <input type="checkbox"/> _N (1.2)Teacher uses a variety of strategies to teach children about emotion words		<input type="checkbox"/> _Y <input type="checkbox"/> _N (3.2) Teacher validates children's emotions by labeling them and helping children talk about their emotions		<input type="checkbox"/> _Y <input type="checkbox"/> _N (3.2)Teacher individualizes instruction on emotions based on children's developmental needs. Procedures and materials vary across children
	<input type="checkbox"/> _Y <input type="checkbox"/> _N (1.3) Teacher teaches about a variety of both positive and negative emotions		<input type="checkbox"/> _Y <input type="checkbox"/> _N (3.3) Teacher provides children with strategies to use when they are angry to calm down		

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17. Teaching problem solving

- Tell me how you teach or help children learn how to solve common social problems in the classroom (e.g., what do you do when someone has a toy you want to play with?). What strategies do you use? What materials do you use? (item 17)
- Describe what you teach children to do when they have a problem. (item 17)
- How do you individualize instruction around problem solving? Can you give me an example? (item 17)

0	1	2	3	4	5
A classroom receives a score of "0" if all behaviors under a score of "1" are not observed	<input type="checkbox"/> _Y <input type="checkbox"/> _N (1.1) Teacher explicitly teaches problem-solving steps*		<input type="checkbox"/> _Y <input type="checkbox"/> _N (3.1) Teacher supports children as they work through the problem-solving process in naturally occurring situations		<input type="checkbox"/> _Y <input type="checkbox"/> _N (5.1) Teacher helps children reflect on their own use of problem solving
	<input type="checkbox"/> _Y <input type="checkbox"/> _N (1.2) Teacher engages children in generating solutions to common classroom problems		<input type="checkbox"/> _Y <input type="checkbox"/> _N (3.2) Teacher notes problem situations and uses those as examples during group situations to talk about how to problem solve		<input type="checkbox"/> _Y <input type="checkbox"/> _N (5.2) Teacher individualizes instruction on problem solving based on children's individual needs.
	<input type="checkbox"/> _Y <input type="checkbox"/> _N (1.3) Teacher provides visual reminders about problem-solving steps and possible solutions		<input type="checkbox"/> _Y <input type="checkbox"/> _N (3.3) Teacher comments on and recognizes children who have been "good problem solvers."		<input type="checkbox"/> _Y <input type="checkbox"/> _N (5.3) Procedures and materials for teaching problem solving vary across children based on their individual goals and needs <input type="checkbox"/> _Y <input type="checkbox"/> _N (5.4) Teacher uses problem solving in interactions with children and models problem-solving steps

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18. Supporting friendship skills

- Tell me how you teach or help children to learn how to be friends? What skills do you teach? What strategies and materials do you use? (item 18)

- How do you individualize instruction around friendship skills? Can you give me a few examples? (item 18)

0	1	2	3	4	5
A classroom receives a score of "0" if all behaviors under a score of "1" are not observed	<p><u> </u> <u> </u> <u> </u> <u> </u> (1.1) Teacher comments positively and descriptively on children who are working together, helping each other or engaging in other friendship behaviors</p> <p><u> </u> <u> </u> <u> </u> <u> </u> (1.2) Teacher encourages children to play together</p>		<p><u> </u> <u> </u> <u> </u> <u> </u> (3.1) Teacher uses a variety of strategies and materials (e.g., discussion, puppets, books) in small- and large-group activities to teach friendship skills (e.g., helping others, taking turns, organizing play)*</p> <p><u> </u> <u> </u> <u> </u> <u> </u> (3.2) Teacher provides children with planned opportunities to practice friendship skills (e.g., role playing, pairing up with a buddy) *</p> <p><u> </u> <u> </u> <u> </u> <u> </u> (3.3) Teacher provides increasing levels of assistance to help children enter and maintain interactions with their peers*</p> <p><u> </u> <u> </u> <u> </u> <u> </u> (3.4) Teacher explicitly teaches or prompts children how to initiate and respond to their peers</p>		<p><u> </u> <u> </u> <u> </u> <u> </u> (5.1) Teacher uses a variety of strategies (e.g., peer buddies, structuring activities) to support peers in helping their friends learn & practice social skills*</p> <p><u> </u> <u> </u> <u> </u> <u> </u> (5.2) Teacher supports children in reflecting on interactions with their peers</p> <p><u> </u> <u> </u> <u> </u> <u> </u> (5.3) Teacher models friendship skills in interactions with children or other adults</p>

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For Items 19-22. Ask the teacher to respond to the questions associated with each item. Write down their responses and use them to score the item

***Note:** For items 19 through 22, scoring will be based primarily on teacher responses to questions. However, you may also use any evidence you observe in the classroom to inform your scoring decisions.

19. Supporting children with persistent problem behavior

- What do you do when children have severe and persistent problem behavior? (item 19)

- What is your role in the process of developing a behavior plan for these children? (item 19)

- What is your role in implementing the plan? Tell me how you know if the plan is working or not. (item 19)

0	1	2	3	4	5
A classroom receives a score of "0" if all behaviors under a score of "1" are not observed	__Y __N (1.1) Teacher initiates the functional assessment process for children who have persistent challenging behavior		__Y __N (3.1) Teacher participates in the development of a behavior support plan by providing functional assessment data to team members __Y __N (3.2) Teacher participates in the development of a behavior support plan by contributing ideas on plan strategies		__Y __N (5.1) Teacher implements individualized behavior support plans including collecting data

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20. Describe how you communicate with your families and promote family involvement in the classroom.

- Describe how you communicate with your families and promote family involvement in the classroom. (item 20)
- What kinds of information about social emotional development and behavior do you share with families? (item 20)
- Can you tell me what you do to try to involve all families? (item 20)

0	1	2	3	4	5
A classroom receives a score of "0" if all behaviors under a score of "1" are not observed	<p>__Y __N (1.1) Formal opportunities for families to visit the classroom are offered</p> <p>__Y __N (1.2) Communication to the family comes periodically from the school/program or teacher (newsletter, open house, parent conferences) .</p>		<p>__Y __N (3.1) Teacher describes how recognition of the family is brought into the classroom (e.g., family photos on bulletin board, my family book)</p> <p>__Y __N (3.2) Teacher regularly provides families with information on what is occurring in the classroom</p> <p>__Y __N (3.3) Teacher has a system for regular communication with families that includes celebrations of the child's accomplishments</p>		<p>__Y __N (5.1) Teacher is able to describe ways they personally connect with families that indicate personal knowledge of the family situation and an appreciation for the family</p> <p>__Y __N (5.2) Teacher uses a variety of methods (e.g., home visits, phone calls, classroom visits, notes, newsletter) to communicate with families to ensure that an effort is made to connect with all families</p> <p>__Y __N (5.3) Communication systems with families are bi-directional, offering families a mechanism to share information about the family or child with the teacher</p>

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21. Involving families in supporting their child’s social emotional development and addressing problem behavior.

- What role do families play in promoting children’s social and emotional development and addressing challenging behavior? (item 21)
- What type of information do you provide to families about supporting their children’s social emotional development and addressing challenging behavior? (item 21)
- Tell me about the role that parents play in developing a plan for addressing children’s challenging behavior at school. (item 21)

0	1	2	3	4	5
A classroom receives a score of “0” if all behaviors under a score of “1” are not observed	<p><input type="checkbox"/>_Y <input type="checkbox"/>_N (1.1) Teacher provides families with information on the importance of social emotional development</p> <p><input type="checkbox"/>_Y <input type="checkbox"/>_N (1.2) Teacher provides families with information on community resources (e.g., parenting classes, mental health services) related to children’s social emotional development and challenging behavior *</p>		<p><input type="checkbox"/>_Y <input type="checkbox"/>_N (3.1) When there is a concern about a child’s challenging behavior or social emotional development, the teacher works with families to collect information on the behavior to determine if there is a need for more intensive support or planning</p> <p><input type="checkbox"/>_Y <input type="checkbox"/>_N (3.2) Teacher gives families practical strategies that they can use during everyday routines and activities to support their children’s social emotional development and prosocial behavior</p>		<p><input type="checkbox"/>_Y <input type="checkbox"/>_N (5.1) Teacher involves families in the process of developing a support plan for addressing challenging behavior</p> <p><input type="checkbox"/>_Y <input type="checkbox"/>_N (5.2) Teacher works with families to develop strategies that families can use at home to address challenging behavior</p> <p><input type="checkbox"/>_Y <input type="checkbox"/>_N (5.3) Teacher works with families to develop strategies that families can use at home to address their concerns about their child’s social emotional development</p>

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22. Strategies used to build collaborative teaming relationships with other adults

- Describe the strategies you use to build collaborative relationships with the other adults who work within your classroom on a daily basis (e.g., classroom assistant). (item 22)

- Describe the strategies you use to build collaborative relationships with the other adults who work within your classroom on a less frequent basis (e.g., mental health person, curriculum coordinator). (item 22)

0	1	2	3	4	5
A classroom receives a score of "0" if all behaviors under a score of "1" are not observed	__Y__N (1.1)Teacher provides directions or instructions to other team members about how to work within the classroom __R__O		__Y__N (3.1)Teacher notes that teaming is important for the classroom* __R__O __Y__N (3.2)Teacher includes planning with other classroom members and professionals as a teaming strategy __R__O		__Y__N (5.1)Teacher includes informal strategies that indicate an intentional effort to recognize and support the contribution of all team members* __R__O __Y__N (5.2)Teacher speaks positively of other team members and describes their positive interactions with each other __R__O

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The following items reflect “red flags” and may represent issues related to teacher training and support or to program policies and procedures.

23. The majority of the day is spent in teacher directed activities	Yes	No
24. Many transitions are chaotic	Yes	No
25. Teacher talk to children is primarily giving directions, telling children what to do, reprimanding children	Yes	No
26. During group activities, many children are NOT engaged	Yes	No
27. Teachers are not prepared for activities before the children arrive at the activity	Yes	No
28. Children are reprimanded for engaging in problem behavior (use of “no,” “stop,” “don’t”)*	Yes	No
29. Children are threatened with an impending negative consequence that will occur if problem behavior persists*	Yes	No
30. Teacher reprimands children for expressing their emotions*	Yes	No
31. Emotions are <u>not</u> generally discussed in the classroom	Yes	No
32. Teacher’s guidance or focus around relationships is on adult-child interactions*	Yes	No
33. Teacher gives group directions to all children in the same way*	Yes	No
34. Teacher tells children mostly what not to do rather than what to do	Yes	No
35. Teacher asks for the removal of children with persistent challenging behavior from the classroom or program	Yes	No
36. Teacher comments about families are focused on the challenges presented by families and their lack of interest in being involved	Yes	No
37. Teacher only communicates with families when children have challenging behavior	Yes	No
38. Teacher complains about other team members and notes difficulty in their relationships	Yes	No

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Appendix I

Classwide Challenging Behavior Codes

Definitions

Challenging Behavior is defined as a behavior that: (a) impedes the completion of activities or routines for a child or children, (b) is disruptive to instruction or classroom activities or routines, (c) interferes with a child's interactions with teachers, peers or materials, or (d) is harmful to self, others, or property.

Challenging Behaviors can be categorized as low intensity or high intensity.

Low intensity challenging behaviors are those behaviors that distract a target child, peers, or a teacher from typical activities, routines, or instruction. After low intensity challenging behavior has occurred, the routine, activity, or instruction continues with minimal adult intervention. Low intensity behaviors generally cause no physical harm to people or property.

Examples of *low intensity* challenging behaviors include:

- Not following instructions or specific rules after a reminder
- Not responding to a direction to start or end a behavior
- Talking to a peer inappropriately (loudly or at a time when talking is not permitted) during group instruction
- Taking a toy from another child
- Laying on the floor when children are expected to sit
- Wandering around the room not engaged in a planned activity or routine
- Touching others when not part of planned activity or routine (sitting too close during circle time, tapping a peer's head when in line, touching a peer's hair during circle time)
- Name calling or brief episodes of verbal teasing. These low intensity verbal behaviors are distinguished from high intensity verbal aggression in that they appear "silly" or playful rather than aggressive or threatening.
- Nonverbal teasing or taunting (sticking out one's tongue, using the middle finger or other gesture)
- Accessing off-limits materials: picking up a teacher's book, turning on the cassette player when not part of activity or routine, going to a closed center, opening a filing cabinet
- Not joining planned activities and routines following adult, peer, or environmental prompt(s)/initiations
- Clings to parent or teacher
- Whines or complains [but not loudly - at a "normal" or acceptable volume]
- Restless, fidgeting. *This may include playing or fidgeting with articles of clothing such as untying shoes, taking off socks, playing with barrettes or ponytail holders, or imposing on other peer's space, such as when a child is moving, rocking or scooting back and forth during circle time, impeding*

on another child's physical space or moving outside of implicit physical boundaries without specific intent to elope.

- ❑ Self stimulatory behaviors that are not disruptive but are distracting. *It is important to note that we are not coding self-stimulatory behaviors for the sake of coding self-stimulatory behaviors. They must be behaviors that distract the child, a peer, or the teacher from the routine or activity (e.g, rocking back and forth, making noises with the hands or mouth). We would not code a child sucking on his hand repetitively if he was attending, seated, and following directions. We would code it if the child's repetitive behavior required adult attention.*

High intensity challenging behaviors disrupt the flow of classroom activities and routines. Adult intervention is necessary to prevent physical harm to people or materials/property or to continue with classroom routines and activities.

Examples of high intensity challenging behavior include:

- ❑ Physical aggression that include hitting, scratching, biting, kicking, or using objects to hit others.
- ❑ Physically pulling away from a teacher when she/he is providing physical guidance
- ❑ Verbal aggression that includes bullying, taunting, threatening, or intimidating a peer or adult
- ❑ Verbal outbursts that include crying, yelling, or whining loudly [at an inappropriate volume], cursing, or verbal resistance (“No!”, “Shut up.”).
- ❑ Tantrums: combination of crying, falling to floor, flailing limbs, stomping feet, physical resistance
- ❑ Property or material destruction
- ❑ Elopement: leaving an area without permission, running to another part of the room without permission, leaving the classroom without permission, hiding or attempting to hide inside or underneath furniture
- ❑ Inappropriate touching: touching or attempting to touch one's self or another person in a way that may violate personal boundaries or be construed as sexual contact (i.e. masturbation, touching another's private parts, pulling down or attempting to pull down clothing, licking or attempting to lick others).
- ❑ Stripping: removing articles of clothing during class time
- ❑ Self stimulatory behaviors that are loud, intense and disruptive (e.g., loud noises, twirling around when supposed to be sitting, etc.)
- ❑ Self-injurious behavior (e.g, banging head, hitting self, picking at skin)

Training

- Data Collectors will be trained by the gold standard
- Data Collectors must complete:
 - one 90-minute observation at or above 80% reliability with the gold standard
 - 2 additional live sessions at 80% or better with another person who is reliable with the gold standard

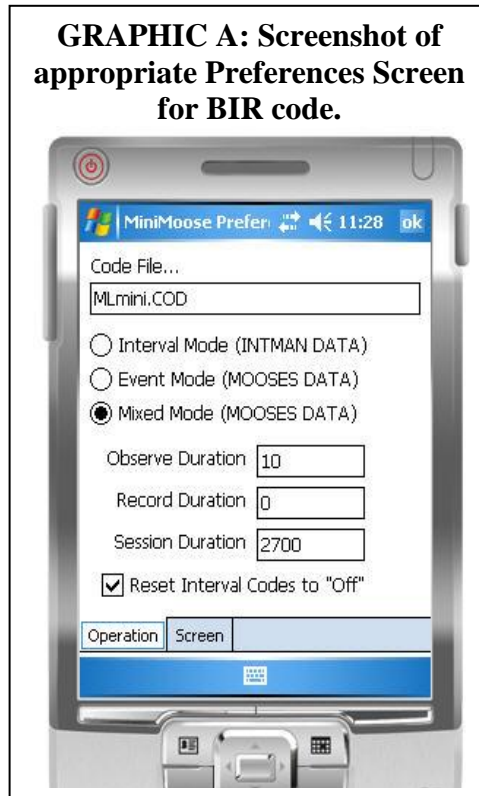
Reliability

- 30% of observations will be completed with a reliability partner

Observation Procedures

- Be sure you have the following with you: PDA, stylus, headphones, back up kit.
- The focus of this observation is the whole class.
- You must observe:
 - Teacher-directed large group
 - Centers
 - A transition
- To finish the 30-min time requirements, you MAY observe any additional in-classroom activity
- Secondary activities you MAY observe if necessary:
 - Meals in the classroom
 - Nap
- Pause the timer if the class leaves the room. Resume when the class returns.
- Start timer ♦ Watch the full 10s interval (don't record any observed behavior) ♦ When you hear "Observe," quickly code the interval you just finished ♦ Repeat ♦ For the final interval, you may code a behavior as you see it occur (do not wait for "Observe" prompt)
- Complete the Data Collection Summary after each observation
- Enter the event on the Data Collector Event Log

Using the Handheld PCs.



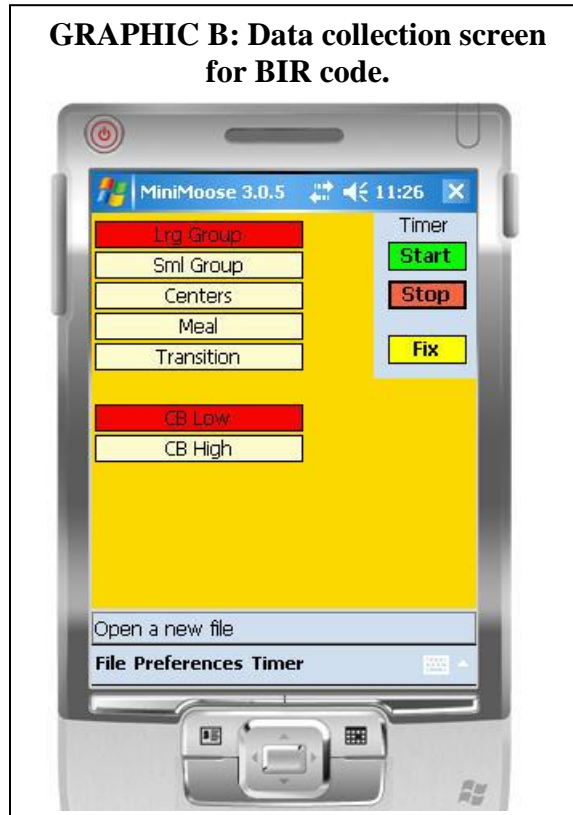
TO CREATE AN OBSERVATION FILE:

1. Click the Start menu in the upper left corner of the screen.
2. Open “MLMiniMooses”
 - a. The first time you use the Handheld, be sure to check the preference. Click Preferences on the bottom of the screen.
 - b. It should say: Mixed Mode, Observe 10, Record 0, Session duration 2700, Reset interval codes to “Off” (see GRAPHIC A)
3. Open a new file
 - a. Each file will be given an 8 character unique identifier. Give the file a name using the following protocol:

SiteTchrWave**B#00**Observer (example: VE1B200D)

- b. Save the file

- c. Approve the header (it is usually the date and time stamp). *The date and time must be correct.*



TO CONDUCT AN OBSERVATION:

- 1. The Screen:** When you open MOOSES (and save your new file), you will see the data collection screen. (see GRAPHIC B)
 - There are 5 buttons at the top of the screen corresponding to typical routines in early childhood classrooms.
 - There are 2 buttons at the bottom of the screen marked “CB Low” and “CB High”
 - There are 3 buttons on the right side of the screen labeled “Start”, “Stop”, and “Fix.”
 - On the bottom left side of the screen a small timer indicates the number of seconds you have observed and the number of intervals completed. At the beginning of the observation this should be clear or say 0.
- 2. The Activity Buttons**

- To indicate the activity that is taking place, simply touch the appropriate button with your stylus. The button will turn red when it has been chosen.
- These buttons are programmed to remain lit until you select a new activity. They do not automatically reset. You do not need to select the activity each interval; you only need to select the activity whenever a change occurs.

3. The Challenging Behavior Buttons

- To indicate the presence of a low-intensity or high-intensity challenging behavior, simply press the corresponding button with the stylus. It will turn red indicating that a challenging behavior occurred.
- If you inadvertently press the wrong button, you can deactivate it by pressing it again. It will turn white.
- The default button color is white (no challenging behavior present).
- At the end of each interval, these buttons will reset to white.

4. The Fix Button

- If you make an error, immediately hit the fix button once.
- Immediately after pressing the fix button press the correct button.
- Example: If you observe high challenging behavior and accidentally press low incidence you would follow this sequence: “low challenging behavior” (incorrect button), then “fix”, followed by “high challenging behavior” (correct button).

5. The Timer

- When you are ready to begin the observation, press the box labeled “Start” in the top right corner. If you are doing an IOA check, count off so that you and your partner start the timer at the same time.
- If you must stop an observation before the cycle ends, press “Stop.” You will be prompted to save your data file when you close MOOSES. If you are pausing your observation during a cycle in order to ensure you observe all required activities (i.e., large group, centers, and a transition), AND you are observing with a reliability partner, count off so that you and your partner pause at the same time.
- If you complete all intervals of an observation, the file is saved automatically.

The Observation

- Observations will last 30 minutes.
- You must observe during at least one structured large-group activity, one period of child-directed time, and one transition.
- Do not observe outdoors or during recess
- Do not observe during routines outside of the classroom (e.g., if the class leaves the room to eat meals or use the restroom).
- Do not observe if another adult takes over the primary teaching role (e.g., the paraprofessional leads Circle)

- If the teacher leaves the room briefly, you may stop the timer and resume when she returns.
- If a cycle is disrupted, you should pause the observation. Cycles may be paused and resumed, but you must get 30 minutes of observation. Examples of when you should pause and not observe include:
 - The class leaves the classroom
 - The assistant teacher or paraprofessional is leading the large-group activity
 - A special visitor is present or other atypical event is taking place
- Sit where you can see the entire room. You may need to stand, and you may need to move around during the observation.
- Use headphones so the audio-timer on the PDA will not distract the class
- Bring your Backup Kit in case of PDA failure

Decision Rules for Activities:

- Transitions begin when:
 - a. the teacher cues children that an activity is ending (but NOT when a teacher gives a transition warning)
 - i. “Ok, let’s clean up”; “It’s time to go to Circle”; “Everyone to the carpet” NOT “5 more minutes until we clean up”

OR

- b. the first child begins transitioning. Make the decision based on whichever happens first.
- Transitions end when all children have moved to the next activity, and they are in the physical area associated with the activity.
- For meals: the transition ends when all children are seated and the “passing out” procedures have ended. One or two children who are waiting for special dietary foods may still be waiting.
- For Centers: If children are free to transition between centers whenever they choose, do not code this as “Transition” time. Rather, continue to code it as Centers. If, however, children are required to transition from center to center together at the same time, code this as “Transition” time. Resume coding for “Centers” when all children have reached the next center.

Decision Rules for Challenging Behavior

Low intensity challenging behaviors are those behaviors that distract a target child, peers, or a teacher from typical activities, routines, or instruction. After low intensity challenging behavior has occurred, the routine, activity, or instruction continues with minimal adult intervention. Low intensity behaviors generally cause no physical harm to people or property.

High intensity challenging behaviors disrupt the flow of classroom activities and routines. Adult intervention is necessary to prevent physical harm to people or materials/property or to continue with classroom routines and activities.

- **Self-stimulatory** behavior is not coded as a challenging behavior unless it is causing a distraction to the child, peer, or teacher. The following behaviors are examples that you would only code if it was distracting or disruptive: rocking, scooting on a chair, making noises with one’s hand and/or mouth
- **A behavior must be seen in order to be coded.** Do not code a behavior based solely on teacher response or the report of another child. For example:
 - A child is in the bathroom and the teacher stands at the door and says, “Pick those papers up. We do not throw things on the floor.” We would **NOT** code this as a low-intensity behavior because we did not actually see the behavior or know when or if it actually occurred.
 - You hear a teacher say, “Oh, Jamal. We don’t hit our friends.” You did not see any behaviors. **DO NOT** code this as a challenging behavior.
 - Two boys are outside your field of vision on the floor in the block center. One boy comes out crying to the teacher that the other boy hit him on the head with a block. We **DO NOT** code the hitting because we did not see it and cannot be sure that it happened as described. Depending on the intensity of the boy who reports the behavior, we **may** code his whining/ tattling as low intensity behavior or as high intensity if he begins to scream out.
- **Classroom expectations.** When a child is not meeting an expectation and the teacher is no longer redirecting the child to the desired behavior, a new instruction given to the child by the teacher will negate the previous expectation.
 - A child is placed in time out and removes himself from time out and begins playing in the block area. We would code this as low challenging behavior [for each interval in which it occurs] until the teacher gives the child a new expectation such as “play nice with your friends” or “help your friends clean up the blocks.”

What do to if you arrive at the site and your PDA fails

- **Every observer will travel with a backup kit. It contains:**
 - A paper-and-pencil form with which to do interval recording for the observation
 - A MotivAider to act as an interval timer (set to 10 seconds)
 - A flash drive/memory card (to use to save data if an observation was already in progress)

Appendix J
Teaching Pyramid Distance Coaching Project
Training Questionnaire

Date: _____

1. The training will assist you in implementing the Teaching Pyramid strategies.
Strongly Disagree 1 2 3 4 5 6 Strongly Agree

2. The implementation guides will help you implement the Teaching Pyramid strategies.
Strongly Disagree 1 2 3 4 5 6 Strongly Agree

3. The classroom materials will you implement the Teaching Pyramid strategies.
Strongly Disagree 1 2 3 4 5 6 Strongly Agree

4. You could implement the strategies just as well without having attended the training.
Strongly Disagree 1 2 3 4 5 6 Strongly Agree

5. You could implement the strategies just as well without having received the Implementation Guides.
Strongly Disagree 1 2 3 4 5 6 Strongly Agree

6. The trainer was knowledgeable and answered my questions.
Strongly Disagree 1 2 3 4 5 6 Strongly Agree

7. You think the strategies you learned about the Teaching Pyramid will have positive effects on your classroom.
Strongly Disagree 1 2 3 4 5 6 Strongly Agree

8. The pace of the training was good.
Strongly Disagree 1 2 3 4 5 6 Strongly Agree

12. You have new strategies to consider when dealing with children with challenging Behavior.
Strongly Disagree 1 2 3 4 5 6 Strongly Agree

13. Your regular teaching practices will change due to the training you received on the Teaching Pyramid.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

15. You would suggest the Teaching Pyramid training to other teachers.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

1. What was the best part of the training for you?

2. What was your least favorite part of the training?

3. Is there any information you feel like you **did not** learn enough about?

4. Is there anything you wish you had learned more about?

4. What if anything has changed about the way you look at challenging behavior?

5. Is there anything you would change about the training and the way it was conducted?

Appendix K

Teaching Pyramid Teacher Final Questionnaire

Distance Coaching Project

- 1. The training you attended helped you learn to use Teaching Pyramid strategies.**

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

- 2. The implementation guides you received at the training helped you use Teaching Pyramid strategies.**

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

- 3. The classroom materials you received at the training helped you use Teaching Pyramid strategies.**

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

- 4. You could have implemented Teaching Pyramid strategies just as well without having attended the training.**

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

- 5. You could have implemented Teaching Pyramid strategies just as well without having received the Implementation Guides.**

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

- 6. The Teaching Pyramid strategies you implemented had a positive effect on children's behavior or social skills in your classroom.**

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

- 7. As a result of the training and/or coaching, you have new strategies to consider when dealing with children with challenging behavior.**

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

8. Your teaching practices have changed due to the training you received on the Teaching Pyramid.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

9. You will use Teaching Pyramid strategies in your classroom next year.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

10. You would suggest Teaching Pyramid strategies/training to other teachers.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

11. The amount of time needed to actively participate in the study was reasonable.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

12. Working with a “distance coach” helped you use Teaching Pyramid strategies.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

Or Not Applicable: I didn't receive coaching sessions

13. Watching videos of your own classroom was helpful.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

Or Not Applicable: I didn't receive coaching sessions

14. The online video library was easy to access.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

Or Not Applicable: I didn't receive coaching sessions

1. Describe how participating in this project influenced your teaching. Please give a few examples.

2. What, if anything, will you change about your classroom next year as a result of your participation in the study?

3. What has changed about the way you look at challenging behavior or social emotional development?

4. Is there anything you would change about the study and the way it was conducted? Consider any aspects of the study including training, coaching, and data collection.

5. How did you use the Implementation Guides during the study? Do you think you will use them in the future? Are there additional things you wished the guides would provide?

For teachers who took part in Video Distance Coaching:

6. Please tell us what you liked and disliked about distance (video) coaching? What would you change about the coaching process?

7. What would make the coaching process easier for you? What would make you more likely to look at online videos?

8. About how much time, per week, did you spend looking at the video coaching website and reading emails? Was the time commitment reasonable?

Thank you very much!!!

Appendix L
Focus Group Questions

Our goal in this focus group is to explore issues related to your use of the Teaching Pyramid Practices. Specifically, we are interested in knowing about how you learned to use the practices, what will help you continue to use them, and how effective you thought they were.

1. The first questions are related to your use of the Teaching Pyramid Practices and how you were supported in learning to use them.
 - a. How well did you learn to implement the pyramid practices?
 - b. What practices did you find most difficult to learn?
 - c. What did you find most helpful about the training and coaching in terms of helping you learn to implement the pyramid practices?
 - d. What was difficult about learning to use the practices?
 - e. How might the training and coaching have been more helpful in learning to use the practices?
 - f. What did you find helpful in using the practices? This might include supports other than your project coach.
 - g. Describe any barriers that prevented you from using the pyramid practices.
2. The next questions are related to how helpful the practices have been in addressing the social emotional development and challenging behavior of the children in your classroom?
 - a. How did the practices affect your overall classroom activities and routines?
 - b. How did the practices affect your interactions with children?
 - c. How did the practices affect children's social skills, emotional competencies and challenging behaviors?
3. The final questions are related to what supports you might need to continue to use the practices.
 - a. To what extent do you think you will use the Pyramid practices in your classroom next year? What practices might you continue to use or what practices might you not continue to use?
 - b. What supports do you think you will need to continue to use the practices?
 - c. What might prevent you from continuing to use the practices?

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