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Using Peer Coaches as Community-Based Competency Drivers in Part C Early Intervention

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Abstract

Using an implementation science framework, this study examines the impact of a multicomponent professional development (PD) approach implemented by internal peer coaches on early intervention providers' use of Family Guided Routines-Based Intervention. The experimental study used a single-case multiple baseline design across participants, replicated in three sites with early interventionist (EI) providers (n = 9) and families with infants and toddlers (n = 18) in U.S. community-based Part C programs. Data indicate a functional relation between the multicomponent PD approach and EIs' use of the intervention. A between-case standardized mean difference effect size was used to confirm the results of the visual analysis. The implications for the use of implementation science frameworks to build competency drivers within early intervention systems are discussed.

Keywords

family-centered, intervention strategies, personnel, families

Part C of the Individuals with Disabilities Education Act provides funds to state programs that serve infants and toddlers with delays and disabilities and their families in the United States (Individuals with Disabilities Education Improvement Act [IDEA], 2004). Unlike services in which providers deliver interventions to children directly, the primary role of early interventionists (EIs) is to enhance the family's capacity to support their child's development during everyday routines and activities (Division for Early Childhood [DEC], 2014; IDEA, 2004). To support caregiver–child interactions, EIs are learning to adopt capacity-building caregiver coaching approaches to improve both child and family outcomes (Douglas et al., 2019; Krick Oborn & Johnson, 2015; Marturana & Woods, 2012; Salisbury et al., 2018).

In a capacity-building coaching approach, EIs share developmental information with families, help families choose functional child targets to embed into everyday routines, and guide families to use evidence-based strategies in their routines by using adult learning strategies (Schertz et al., 2011; Trivette et al., 2010; Woods et al., 2011). EIs also help families reflect and problem-solve about the intervention strategies and how they can include additional family members and routines into the child's intervention (Windsor et al., 2019). EIs that use a caregiver coaching approach strengthen caregiver–child interactions and aim to boost the family's feelings of confidence and competence in supporting their child (Dunst & Trivette, 2009; Kemp & Turnbull, 2014; Trivette et al., 2010; Woods et al., 2011). Structural equation models suggest that EIs can influence child outcomes *directly* by supporting caregiver–child interactions and *indirectly* by increasing family well-being and confidence in their ability to support their child (Trivette et al., 2010) and both the indirect and direct pathways can be influenced by intentional, strengths-based caregiver coaching by EIs (Trivette et al., 2010).

Challenges in Implementing a Caregiver Coaching Approach

While family capacity-building practices are recommended, EIs struggle to implement caregiver coaching approaches in their everyday practice with families (Douglas et al., 2019). In a recent report by Douglas and colleagues, 74% of EIs reported insufficient pre- and in-service opportunities to learn how to coach families in EI. In the Douglas et al. study and in the present investigation, we use the term EI to

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include early childhood special educators (ECSEs), speech language pathologists (SLPs), occupational therapists (OTs), physical therapists (PTs), and others who provide services in Part C programs. EIs who are SLPs, OTs and PTs have training backgrounds across the life span and many providers report a lack of EI experiences in coursework during preservice training (Douglas et al., 2019). ECSEs, too, may lack experience with home-based caregiver coaching models (Campbell & Sawyer, 2009; Douglas et al., 2019). While Douglas et al. (2019) indicate that EIs value coaching approaches and that they cite its positive impact on family and child outcomes, EIs indicated that they learned to coach "on their own" (*p.* 10) with few systematic supports in their agencies.

Observational studies also indicate that in the absence of professional development (PD), EIs are not likely to use evidence-based strategies to coach adult caregivers who are important to the child (Marturana & Woods, 2012; Peterson et al., 2007). In a 2007 descriptive study, EIs spent less than 1% of sessions coaching families in triadic interactions with the child (Peterson et al., 2007). Sawyer and Campbell (2017) also investigated interactional strategies between EIs and families and found similarly low rates of caregiver coaching behaviors. In a descriptive study of 342 EI home visits, EIs used coaching strategies like guided practice (in which an EI supports a caregiver to use a new strategy) in fewer than 1 % of intervals and demonstrations of a strategy in about 2.2 % of session intervals coded (Sawyer & Campbell, 2017). Capacity-building strategies like problem-oriented reflection also occurred rarely, in only 1% of coded intervals. Taken together, these data indicate a critical need for PD to increase EIs' use of coaching approaches to enhance caregiver–child interactions during a critical developmental period (Douglas et al., 2019; Romano & Schnurr, 2020). Without effective PD in caregiver coaching models, EIs are likely to use child-directed strategies that miss opportunities to support caregiver–child interactions (Marturana & Woods, 2012; Sawyer & Campbell, 2017). Reducing the caregiver-coaching implementation gap is well suited to the use of implementation science (IS) frameworks to increase the number of EIs in Part C programs who use evidence-based caregiver coaching approaches in community-based settings (Romano & Schnurr, 2020).

Family-Guided Routines-Based Intervention

While EIs nationwide are not consistently implementing capacity-building models (Peterson et al., 2007; Sawyer & Campbell, 2017), caregiver coaching is a central recommended practice from the Division for Early Childhood and several models in the literature base include it. Family-Guided Routines-Based Intervention (FGRBI) is an approach intended for use in Part C programs that uses caregiver coaching as a key mechanism to build family capacity and to support individualized, functional child outcomes in meaningful contexts (Kashinath et al., 2006; Woods et al., 2004). The family itself is central to FGRBI, and caregivers are actively engaged to choose child targets, strategies, and everyday family routines during the intervention. FGRBI and its caregiver coaching framework, referred to by the acronym SS-OO-PP-RR (Setting the Stage, Observation and Opportunities to Embed, Problem-solving and Planning, Reflection and Review), has been evaluated in home-based models (Brown & Woods, 2015; Kashinath et al., 2006; Windsor et al., 2019; Woods et al., 2004) and in early care and education settings (Friedman & Woods, 2015; Romano & Woods, 2018). In the home-based literature, caregivers of children with autism spectrum disorders (ASD) (Brown & Woods, 2015; Kashinath et al., 2006) and caregivers of children with significant intellectual disabilities (Brown & Woods, 2015; Windsor et al., 2019) learned to implement responsiveness strategies in family-identified routines like getting dressed, playing peek-a-boo and tickle games, reading books, and eating dinner. Children, too, made gains on prelinguistic and language targets within family-identified daily routines (Brown & Woods, 2015; Windsor et al., 2019).

The SS-OO-PP-RR coaching framework used in FGRBI was developed to meet the learning needs of adult caregivers. Research and theory indicate that adults learn best when they are able to choose what they learn, when they have content about the topic and when they are engaged in practice opportunities, and when they receive feedback on their performance (Bransford et al., 2000; Dunst, 2015; Knowles et al., 2005). They also benefit from opportunities to reflect on their practice and to problem solve factors that may increase their use of the new skill (Dunst, 2015; Lorio et al., 2020). The SS-OO-PP-RR coaching approach includes opportunities for the adult caregiver to choose the focus of the intervention to align it with their priorities, to practice the intervention strategies in context, and to reflect and problem-solve about how to better support the child's targets (Brown & Woods, 2015; Romano & Woods, 2018). In this study, FGRBI serves as the intervention model that was implemented, or the "it" that was targeted within the IS approach (Odom et al., 2014).

PD and IS in Early Childhood Interventions

IS offers a framework by which identified interventions can be installed and scaled in real-world programs. Systematic PD is one critical type of implementation support that increases the capacity of professionals to use the intervention (Odom et al., 2014). While there are few experimental PD studies specific to EI (Krick Oborn & Johnson, 2015; Marturana & Woods, 2012), research syntheses in early

childhood have distilled several features that are thought to support changes in practice across early childhood settings (Desimone, 2009; Dunst, 2015; Snyder et al., 2011, 2012). These features include explicit teaching of content about an approach, frequent job-embedded opportunities to practice, multiple and multimodal opportunities for learners to reflect, coaching on real-world practice with enough intensity to increase implementation, and follow-up support to ensure lasting changes in practice.

While these features have emerged as best practices in PD, early childhood researchers face considerable challenges in translating this research to practice and in using IS models to help create lasting systems change across states and agencies (Metz et al., 2013; Piasta et al., 2017; Romano & Schnurr, 2020). Within IS frameworks, competency drivers are key mechanisms of change in EIs' practice (Fixsen et al., 2013; Metz et al., 2013). Competency drivers are the people and processes that help transfer knowledge and skills to the learner. While researcher-delivered models of PD have shown evidence of promise in content areas as wide-ranging as literacy interventions (i.e., Piasta et al., 2017) and positive behavioral supports (i.e., Hemmeter et al., 2016), investigations that use community-based or "indigenous" agents as competency drivers continue to face challenges.

Across early childhood settings, models that use real-world staff as competency drivers of PD have struggled to show evidence of effectiveness. Piasta et al. (2017) tested a statewide language and literacy intervention for early childhood educators. Longitudinal data analyses indicate that the state-offered PD, either with or without coaching, did not lead to gains in participant knowledge or practice outcomes above the control condition. In EI specifically, Coogle and colleagues (2019) tested a technology-supported, performance-based feedback approach implemented by program staff to increase the use of family engagement strategies and embedded learning opportunities by using a single-case experimental design. Two of three EIs showed increases in family engagement strategies across conditions and caregivers' use of strategies was variable. While few investigations support the use of real-world professionals as agents of PD, supporting competency drivers is an important ingredient in the sustainability and scalability of PD approaches in early intervention, preschool, and school-age interventions. If PD is only effective when *external* competency drivers like research teams are used, it is difficult to conceive of any intervention that would have adequate funding and resources to be brought to scale. Because the early childhood community has struggled to develop PD interventions that use an IS approach that use *internal* agents to promote and sustain changes in practice, it is important to evaluate programs that aim to build capacity within agencies to identify necessary processes for creating change.

Current Study

In this study, we used trained peer coaches who had assumed leadership responsibilities as part of their regional implementation teams and as coaches in the years prior to the study as their regions installed and scaled FGRBI. We refer to these EIs as "peer coaches" because while they have additional training in coaching, they did not receive additional pay for their coaching nor did they have supervisory roles in their programs. We investigated the effectiveness of using trained internal peer coaches as competency drivers to support EI changes in their use of FGRBI and caregiver coaching practices. The following research questions guided our study:

Research Question 1 (RQ1): Can trained peer coaches conduct a multicomponent PD sequence with fidelity?
Research Question 2 (RQ2): Is there a functional relation between the peer coach's use of the multicomponent PD sequence and EIs' implementation of FGRBI key indicators during home-based EI sessions?
Research Question 3 (RQ3): Do EIs vary in their implementation of the FGRBI key indicators across families during each phase of the study?
Research Question 4 (RQ4): Do participant children show pre–post gains in communication scores on a progress-monitoring tool during the EIs' PD?

Method

Participants

Early interventionists. We recruited nine EIs from three regional agencies within a state Part C program in the U.S. Midwest with approval from the university's Institutional Review Board. EIs had to meet the following criteria in order to aprticipate: (a) they had an active EI caseload within their local Part C program, (b) they had not participated in training or PD on FGRBI prior to this study, and (c) they were willing to commit to the PD sequence. Three EIs from each of the three sites consented to participate ($n = 9$). The EIs were SLPs ($n = 3$), ECSEs ($n = 3$), and teachers of the deaf and hard of hearing ($n = 2$). One EI was dually certified in ECSE and SLP. They had a range of 2–28 years' experience in home-based early intervention. Additional demographic information is provided in Table 1.

Families and children. Once each EI consented to participate, she identified two families on her caseload who also consented to participate. Families were eligible if they had a child who was receiving services within the Part C program in a rural Midwestern state. To be eligible for the study, children had to be younger than 30 months at the beginning of the study to enable the EI to serve the family until the child transitioned out of Part C services. Families in this

Table 1. Demographics of Peer Coach and Child/Family Study Participants.

Characteristic	*n* or *M* (range)	%
Child and family characteristics at entry		
Child gender male (female)	13 (5)	
Mean age in months at entry	23 (9–32)	
Child ethnicity		
Caucasian	17	94
Hispanic	1	0
Maternal education		
High school diploma	4	22
Some college	6	33
4-year degree	3	17
Graduate degree	2	11
Not reported	3	17
Number of families who use social services	8	50
Number of families who use more than one social service	6	33
Provider characteristics at entry		
Gender, female	9	100
Ethnicity, Caucasian	9	100
Mean age in years	42 (25–58)	
Disciplinary background		
Early childhood special education	2	22
Speech-language pathology	4	44
Teachers of deaf and hard of hearing	2	22
Dual certification–ECSE/SLP	1	11
Years' experience in EI	11.6 (1–25)	
Hours per week in EI outside of participant families	11.8 (0–40)	

Note. ECSE = early childhood special educator; EI = early interventionist; SLP = speech language pathologist.

study (n = 18) represented a range of socio-economic statuses. Half of the participant families received public benefits like Medicaid or support from Women, Infants, and Children at entry into the project (n = 8); several families reported the use of multiple public supports (n = 6). Table 1 provides additional demographic information regarding children and families. Although the children all had communication-related goals on their Individual Family Service Plans (IFSPs), their disabilities and services ranged widely.

Peer Coaches

Peer coaches conducted all PD in this investigation. Each peer coach had at least 2 years of training in FGRBI and in training specific to peer coaching as part of the Exploration and Installation phases of the IS approach within the state. To participate in this evaluation, each coach achieved the following criteria prior to the study: (a) they reached fidelity in their own implementation of FGRBI with families at 80% of the FGRBI key indicators (see "Measures" section) during their own PD with external, university-based coaches (see Marturana & Woods, 2012 for details about the initial training process), (b) they reached at least 80% in scoring reliability on the key indicators with external coaches, and (c) they coached at least five other EIs with a coaching fidelity checklist (see "Treatment Fidelity" section) with at least 80% fidelity. Two of the three peer coaches were ECSEs and one was an SLP. All coaches maintained active EI caseloads during this study. Peer coaches did not receive external support on FGRBI from the research team during this investigation and they were the sole "competency drivers" with whom the EIs had contact.

Settings and Materials

PD intervention. PD and coaching sessions were conducted from a distance using Zoom web conferencing. EIs and coaches conducted sessions together from their field offices or from their homes using laptop computers. During each session, the peer coach shared her screen to jointly view materials like PowerPoint slides and video exemplars that were developed by the external university team in prior years.

Home visits. EIs conducted their typical home visit sessions in families' homes with materials common to the family's everyday routines. All families (n = 18) lived in communities that were considered rural for the purposes of federal health programs. Home visits took place twice per month, per family on average.

Measures

FGRBI and SS-OO-PP-RR key indicators. The key indicators (Woods, 2018) are a set of 12 operationalized practices that EIs use during home visits to build the family's capacity to support their child. These indicators have been used in prior studies that use EIs in a coaching role with caregivers (i.e., Brown & Woods, 2015; Romano & Woods, 2018). Each indicator was scored a zero, one, or two with both quantitative and qualitative behavioral criteria that define each indicator at each level. See the online supplemental files for the indicators and scoring criteria. We report the percentage of items observed out of a possible 24 points. EIs recorded their own home visits and loaded the videos onto an online platform. The videos were observed by undergraduate research assistants who had been trained to score the key indicators on previous projects. The research assistants were blind to phase changes and to the specific purpose of the investigation.

Individual Growth and Development Index–Early Communication Indicator. Child data were measured pre- and post-intervention using the Individual Growth and Development Index–Early

Communication Indicator (IGDI-ECI) (Luze et al., 2001). The IGDI-ECI is a 6-min, semistructured play interaction designed to capture children's expressive communication that is benchmarked from birth to 42 months. The IGDI-ECI can be used to measure communication growth over time and results may be compared to a normative sample of more than 5,000 infants/toddlers with and without developmental disabilities. Reliability of the IGDI-ECI demonstrates mean inter-rater agreement of 90% and test–retest total communication score reliability of $r = .89$ (Luze et al., 2001). Each gesture and vocalization receive one point each, while words accrue two points and word combinations earn three per utterance during the probe (Luze et al., 2001). The IGDI-ECI probes were conducted by the child's interventionist at the end of a home visit and were scored by student researchers trained on the measure. Reliability was conducted by an undergraduate research assistant on 25% of the probes. Reliability scores averaged 94% and had a range of 85.6–100%.

Coaching feedback session checklist. Coaching feedback sessions were conducted by peer coaches who used a researcher-developed protocol to guide the coaching process. The coaching feedback sessions were designed to engage the EIs as adult learners to include elements of reflection, specific content on the model, feedback on their use of the indicators, and joint planning with the coach. These components are intended to engage the EIs to learn new content about coaching and FGRBI, reflect on their practice, receive specific performance-based feedback, problem-solve with their peer coach, and to set their own implementation goals. The Coaching Feedback Checklist is included in the online supplemental materials.

Experimental Design

We conducted a concurrent multiple probe single-case experimental design across participants with replications in three sites. The order of EIs was randomized by the research team in sites 1 and 2. In site 3, the order was not randomized and was selected based on EIs' availability. In this site, the third tier EI was placed in that position as she waited to recruit a second family. Visual analysis (Barton et al., 2018) was used to identify functional relations between the PD intervention and EI use of caregiver coaching use on the key indicators. When reporting functional relations, we considered comparisons across conditions including between the baseline and the module plus coaching conditions. We also used the between case-standardized mean difference (BC-SMD; Pustejovsky et al., 2014) effect size to evaluate the results. For the distal child outcome, child communication on the IGDI-ECI, we used a paired samples *t* test to describe pre–post changes.

Procedures

Baseline. During the baseline phase, EIs conducted home visits as they typically would, and video recorded their sessions with participant families. During this time, they did not interact with their coaches about content related to FGRBI. Agency leaders also ensured that the participant EIs did not receive content related to FGRBI in emails, meetings, or other trainings throughout the study. After recording each visit, EIs loaded videos onto the TORSH platform. The baseline condition lasted for a minimum of five sessions in accordance with What Works Clearinghouse guidelines for single-case designs (Kratochwill et al., 2010). The frequency of home visits depended on the family's IFSP and any naturally occurring schedule changes (family cancelations, provider illness, etc.).

Online module phase. After the baseline phase, EIs completed online modules that were comprised of videos with narration on key components of the intervention model. Handouts to support the content were embedded into the modules. These modules were divided into 3 weeks' worth of content: (a) FGRBI, (b) the SS-OO-PP-RR coaching approach, and (c) the 5 Question Framework for families (see Windsor et al., 2019 for a description of this framework). After completing the online content independently each week, EIs and coaches met through a Zoom teleconference to discuss the content. During these "debriefing sessions," coaches used a standardized set of PowerPoint slides and companion protocol to guide the conversation. At the end of each session, the EI was prompted to create a goal to use FGRBI with families during the following week. Example goals included: "Support the family to identify a routine to try during the session" or "Help the family set a plan for the session." Coaches supported the EIs to generate ideas for how to achieve each goal. Probes during the module phase were gathered concurrently as the provider completed the modules and participated in the debriefing sessions. The module phase was designed a priori to last for 3 weeks, and providers proceeded to the coaching phase when the modules and debriefing sessions were complete.

Video-annotated performance feedback during the coaching phase. After completing the modules, EIs entered the coaching phase. The coaching phase included two primary components: video-annotated feedback and coaching feedback on the EI's session. The TORSH™ web-based program was used for loading videos and for written, video annotated feedback given to the EIs. TORSH™ talent is a web-based platform used by education systems and in research designed for professional learning. Users load videos to the platform and coaches can offer annotated feedback directly on to the video. Learners can then view the

comments on their video. Other features include built-in rubrics for feedback and tracking of goals within the site.

After loading each home visit recording to TORSH™ platform, peer coaches reviewed the video and annotated the session by marking when each FGRBI key indicator occurred. They also used reflective questions to encourage the EIs to think about ways to increase their use of the key practices. For example, if a mother and EI talked about how the child communicates when she is in her highchair for breakfast, the coach might say

> Mom mentioned how Kylie turns her head away when she's done eating. How can you get mom to try this routine with Kylie during the session so that you can practice ways to help Kylie gesture "all done" as a next step? What could you say to help mom begin the routine?

The EIs also watched their videos in playback and completed a self-assessment checklist after each session to support their own reflection on their practice. See the online supplemental files for a screen shot of the program.

Coaching feedback sessions. After annotating the videos in TORSH™, EIs and coaches met via Zoom twice per month (one session focused on each participant's family) to discuss the EI's use of FGRBI. Coaches used a set of materials including a protocol that served as a fidelity checklist to guide the sessions. Each session was designed to engage the EI to offer updates on the family, to set a focus for the feedback session, to discuss how their use of FGRBI affected the family's participation in the session, and to reflect on and problem-solve key practices that were going well and those that remained a challenge to implement. Each session concluded with the EI generating an actionable goal about how she would support the family during the following session. See the online supplemental files for the Coaching Feedback Session protocol.

Interobserver Agreement

We conducted reliability checks on a minimum of 30% of all home visit sessions. Videos were chosen for coding at random, and student observers were blind to the condition for home visiting sessions. The overall reliability for coding on the FGRBI Key Indicators, the dependent variable in the study, was 88.95% (range = 83–100). Average interobserver agreement (IOA) for sessions in baseline was 88.8% (range = 83–100). During the module phase, IOA was 87.25% (range = 83–100). During the coaching phase, coders had a mean agreement of 91.66% (range = 83–100). We also conducted reliability checks on the scoring of the coaches' fidelity of implementation during the coaching phase. Coders blind to the specific purpose coded 30% of feedback sessions at random, and 20% of those were scored by another observer for IOA. Mean IOA was 93.25% (range = 83–100).

Treatment Fidelity

Module phase. During the module phase, EIs self-reported the completion of the online activities. Peer coaches used a self-checklist based on the protocol to ensure that they delivered the key components of the content, asked reflective questions, and supported the EI to identify their primary goals during the module phase. These sessions were also recorded and shared with the research team to verify the fidelity components. Module phase videos were reviewed by research assistants for these components. 100% of the required components were delivered during the web conferences conducted during the module phase.

Coaching phase with annotated video feedback. In the coaching phase, external coders blind to the purpose of the study reviewed the coaching feedback sessions for fidelity of implementation. Coders were trained to reliability on a previous project that used the same implementation protocol, and they maintained an average IOA of at least 80% before coding the data from this study. IOA scores are reported above.

Results

Research Question 1

All three peer coaches completed the PD sequence at fidelity throughout the module phase and the coaching phase. Coaches' means by phase are reported in Table 2. The coach in Site 1 had the highest mean level of fidelity at 91%. Overall, coaches averaged at least 80% in both the module and the coaching phase of the intervention. Coach 3 had the widest range of coaching feedback session fidelity scores. Her sessions ranged between 63 and 93 across the three EIs with a mean of 83%. With the exception of one coaching session with Eva, all EI-coach feedback sessions were above 80% fidelity on the coaching feedback protocol.

Research Question 2

We identified a functional relation between the intervention and EI use of the FGRBI key indicators across EIs. We observed increases in the EIs' use of FGRBI key indicators when peer coaching commenced, which was replicated across all three sites. However, the magnitude of change varied across EIs within each site. The BC-SMD effect sizes are listed in Table 3 for each site. The effect sizes were generated by entering the raw data across phases into the SCDHLM online effect size calculator (Pustejovsky et al., 2020). The effect sizes were large (range = 1.49–2.63) and

Table 2. Peer Coach Implementation Fidelity.

Provider	Module phase %	Coaching phase %
Coach 1		
Patrice	100	85 (80–89)
Polly	100	95 (90–100)
Pamela	100	93 (93)
M		91
Coach 2		
Donna	100	89 (83–95)
Darcy	100	85 (80–89)
Dani	100	93 (93)
M		88
Coach 3		
Ella	100	89 (86–93)
Emily	100	87 (87)
Eva	100	72 (63–80)
M		83

Table 3. Between Case Standardized Mean Difference (BC-SMD) Effect Sizes Across Sites.

Site	BC-SMD estimate	*SE*	95% CI
1	1.49	0.39	[0.69, 2.29]
2	2.11	0.50	[1.04, 3.17]
3	2.63	0.60	[1.39, 3.87]

could be statistically distinguished from zero. The effect size represents the difference between the baseline and intervention conditions; the intervention condition included the module phase. Means and ranges of implementation by provider, family, and phase are reported in the online supplemental materials.

Site 1. Patrice demonstrated a slight downward trend in baseline (range = 29–46%). She had a slight increasing trend during the module phase, and a slight change in level (range = 33–58%) with two of the three data points overlapping with baseline data. With the onset of the coaching, she had an immediate increase in level and trend that reached a peak of 88% but decreased in the final datum point (range = 58–88%). No data in the coaching phase overlapped with the baseline condition and only one of the five data points overlapped with the module condition. During the follow-up phase, Patrice maintained levels of implementation reached during the coaching (range = 71–88%). See Figure 1.

During baseline, Polly had stable implementation between 29% and 42% of the key indicators. During the module phase, she had an immediate increase followed by a return to baseline level (range = 38–54%) with two of the three data points overlapping with baseline data. During the coaching phase, Polly demonstrated an immediate increase followed by an upward trend (range = 58–71%), and no data overlapped with the module or baseline conditions. Polly had a follow up session that dropped to a level above baseline at 50%.

Pamela had a stable baseline across families with a mean of 43% and one low datum point (range = 21–50%). During the module phase, her data had a range of 42–63% and one of three data points overlapped with baseline. With the onset of the coaching condition, data remained at levels attained in the module condition with an increasing trend (range = 63–79%), and two of the three data points overlapped with the module condition. Pamela had no overlapping data points between the coaching phase and the baseline phase.

Site 2. Donna demonstrated stable and low baseline levels (range = 25–42%). During the module condition, Donna had an increasing trend, a change in level (range = 46–83%), and no data overlapped with baseline. With the onset of the coaching, Donna's use of the indicators stabilized at about 80%. No data in the coaching phase overlapped with the baseline condition, but all of the data overlapped with the module condition. During the follow-up phase, Donna maintained levels of implementation reached during the module and coaching phases (range = 67–83%). See Figure 2 for the graphed data from Site 2.

Darcy also demonstrated stable and low baseline levels (range = 25–42%). During the module condition, Darcy had an immediate increase followed by a steep decreasing trend (range = 37–70%), and one of the three data points overlapped with the baseline condition. With the onset of the coaching, Darcy's use of the indicators had an immediate increase and some variability (range = 42–71%).

Dani also demonstrated stable and low baseline levels (range = 25–42%). During the module condition, Dani's use of the indicators reached 50% for two sessions, which did not overlap with baseline data. With the onset of the coaching, Dani's use of the indicators had an immediate increase (range = 67–83%) and did not overlap with the module condition.

Site 3. Ella demonstrated stable and low baseline levels (range = 33–37%). During the module condition, Ella had a slight increase in level (range = 46–50%), and no data overlapped with baseline. With the onset of the coaching, Ella's use of the indicators increased slightly and no data overlapped with the baseline or module conditions (range = 54–63%). See Figure 3.

Emily demonstrated stable and low baseline levels (range = 25–42%). During the module condition, Emily had a slight increase in level (range = 42–46%), and no data overlapped with baseline. With the onset of the coaching, Emily had a slight increasing trend and one of the four data points overlapped with the module and baseline conditions (range = 42–65%).

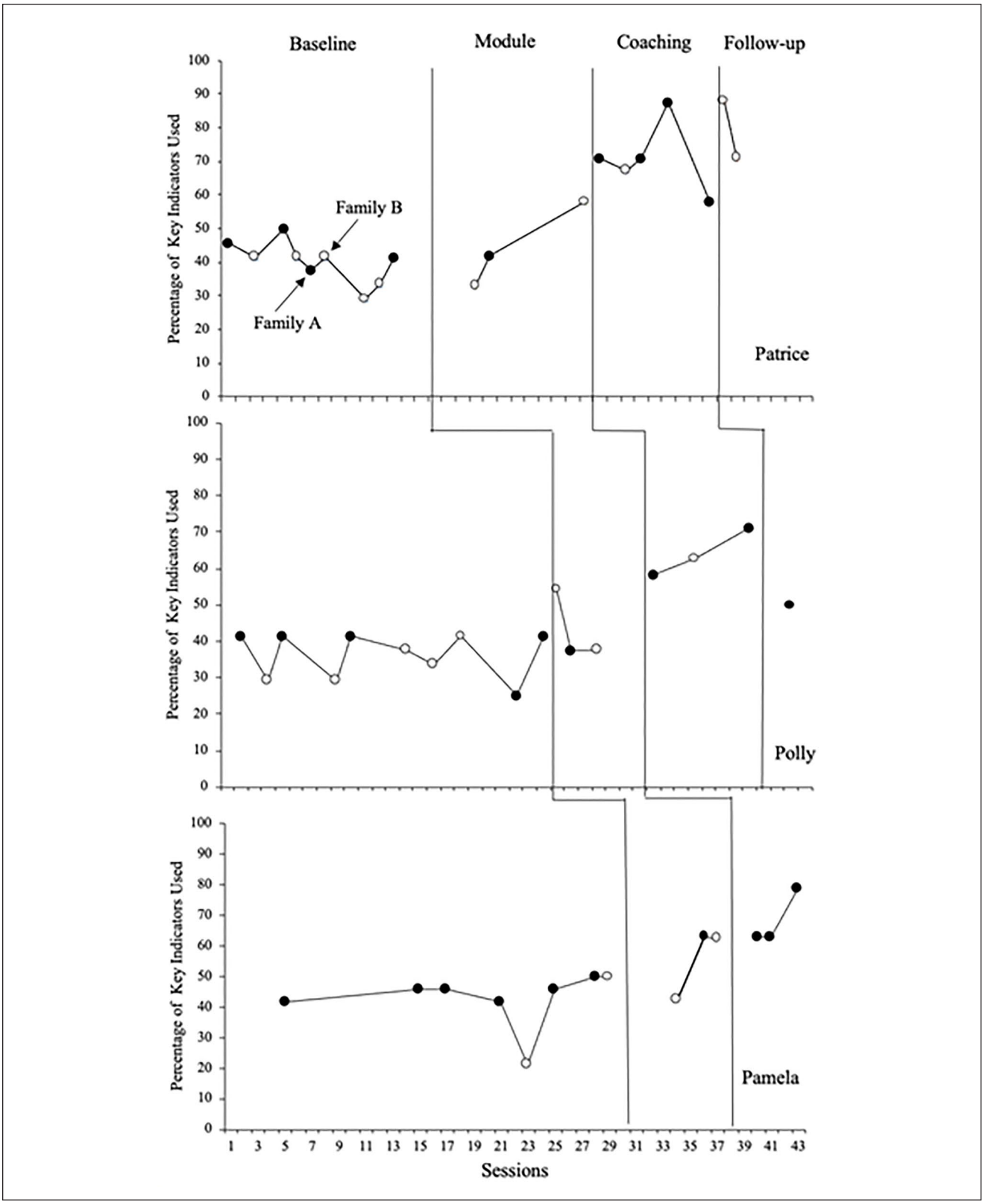

Figure 1. EIs' use of the FGRBI key indicators in Site 1. EI = early interventionist; FGRBI = Family-Guided Routine-Based Intervention.

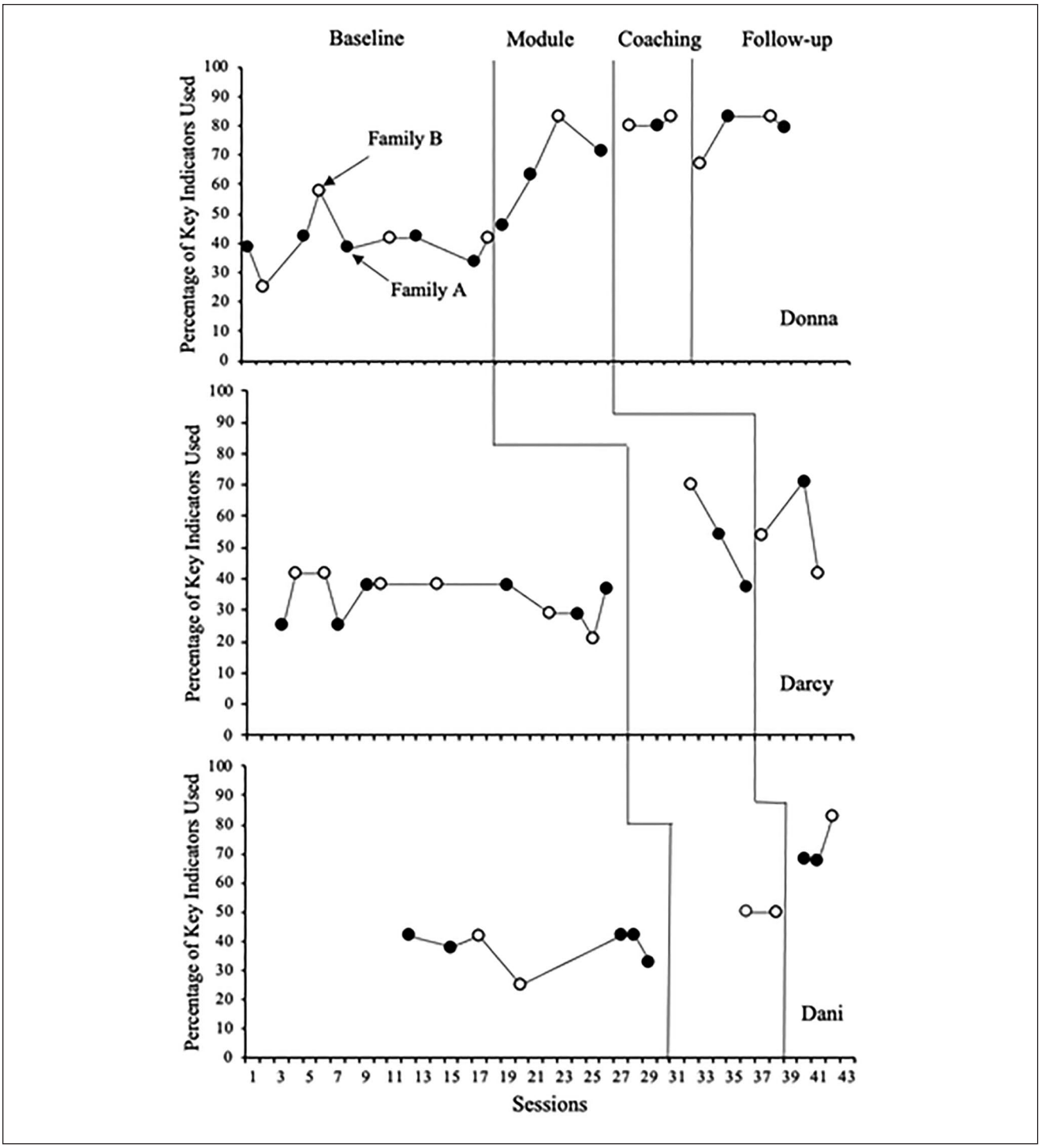

Figure 2. EIs' use of the FGRBI key indicators in Site 2. EI = early interventionist; FGRBI = Family-Guided Routine-Based Intervention.

Eva demonstrated a stable and low baseline level at 33%. During the module condition, Eva had a slight increase in level (range = 33–46%), and one of the three data points overlapped with baseline. With the onset of the coaching, Emily had a slight increasing trend and one of the three data points overlapped with the module condition (range = 50–58%).

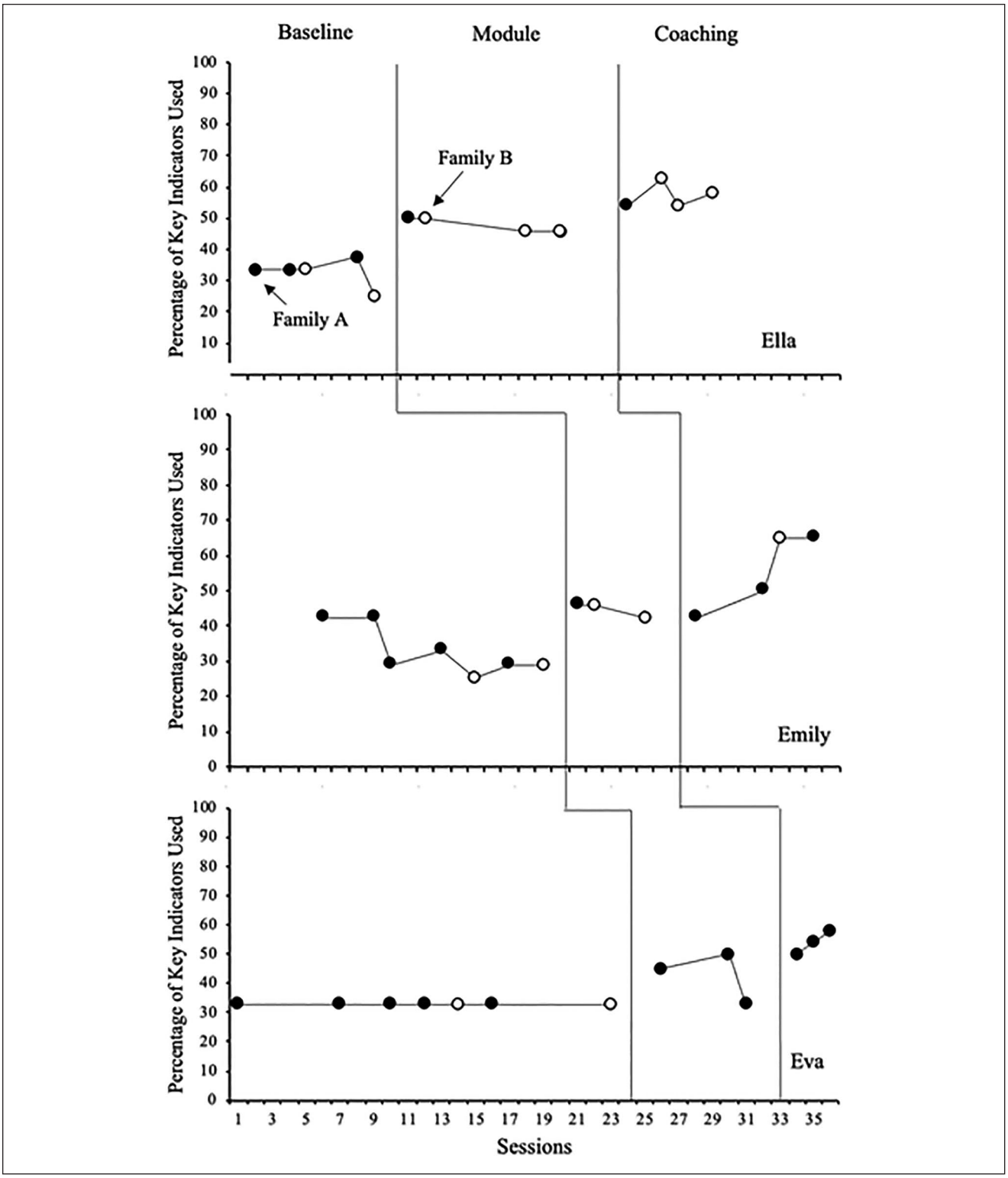

Figure 3. EIs' use of the FGRBI key indicators in Site 3. EI = early interventionist; FGRBI = Family-Guided Routine-Based Intervention.

Research Question 3

Across sites and across phases, EIs implemented the FGRBI key indicators at similar rates with both families. During baseline, there was no indication of variability in use of the key indicators by family (In Figures 1–3, Family A is represented with a black circle, and Family B with an open circle). During the module and coaching phases, there were also no noticeable variations by family.

Research Question 4

We used the IGDI-ECI to examine pre–post changes in child communication on the weighted Total Communication Score. The mean pre-test score was 19.94 (n = 16; 4–66). The mean post-test score was 45.69 (n = 16; 6–121). The paired samples t test indicated a significant difference in pre- and postscores $t(15) = -3.06$, $p = .008$. These data indicate that, on average, children made gains in their communication skills during the study.

Discussion

This PD intervention offers an example of how IS frameworks can be used to enhance the quality of service delivery in EI. This study offers initial experimental evidence that trained peer coaches supported changes in EI practice with real-world families from a range of income levels and educational backgrounds in a community-based sample. Across the three sites, all nine EIs made gains above baseline conditions across two families each. The strength of these findings comes, in part, from the replications across sites that each yielded increases in EIs' use of the model. Data across the nine EIs from a range of disciplinary backgrounds display similar trends before receiving specific coaching on FGRBI. Most EIs used about 30% of the FGRBI Key Indicators pre-PD, and they were stable in their implementation before receiving PD. This offers a preliminary snapshot about the degree to which EIs coach families before they receive ongoing, systematic coaching on their practice. Gains during the module phase were variable, but EIs made consistent changes in level with the onset of the coaching phase, particularly in Sites 1 and 2. EIs in Site 3 made gains above baseline but did not reach intended levels of fidelity (a minimum of 70%). There is evidence of behavior change during the coaching phase in all nine EIs, although there was some variability for a few participants (i.e., Patrice, Darcy). Six of the EIs reached at least 70% on the 24-point scale.

Site Differences

While each of the sites had peer coaches that implemented the PD model with fidelity, the participant EIs had professional characteristics that might have influenced the uptake of FGRBI in their practice. In Site 3, two EIs were teachers of the deaf and hard or hearing and served caseloads from birth to 21. The third EI was an SLP who also served a birth to 21 caseloads. It is not uncommon that some states and programs have EIs who serve a wide age range and who have diverse service delivery models across populations (i.e., early intervention, preschool, school-age settings). EIs in Site 3 had the smallest caseloads, and they struggled to attain the same degree of consistency in home visits as the EIs in Sites 1 and 2. Infrequent home visits for Eva in Site 3, in particular, might have influenced her ability to practice the model with her families. The smaller changes in level could also point to the importance of either a higher and more concentrated dosage of coaching feedback, the role of frequent practice to learn new skills, or both. Even so, EIs in Site 3 made gains above baseline in the intervention condition.

Multicomponent PD Approach

In order for educational research across content areas to be translated into practice in community-based settings without losing effectiveness, it is critical to test PD approaches with evidence of promise and assess which components were the necessary ingredients to support changes in practice (Metz et al., 2013). This study offers useful information about the degree to which EIs can make changes in practice when receiving content in an online format followed by coaching. The data indicate that the direct content from the online modules, even with reflection and goal planning, yielded variable results on EI practice as a stand-alone mode of PD. After the onset of the coaching phase, however, EIs across sites made immediate increases, and several indicated increasing trends over time. While we cannot generalize the findings to other interventions, the data offer a contrast between a condition in which participants were self-driven learners with online content and discussion with a condition in which EIs received coaching specific to their own performance. This is not to say, however, that the module phase was not an important part of the multicomponent approach. It might have provided a foundation of content knowledge on which the coaching was added, and it could have accelerated the speed at which EIs made a change within the coaching condition. In sum, the findings offer additional experimental support for the use of coaching in PD models in early childhood as delivered by trained peer coaches internal to the EI program.

Several features of the PD approach might have contributed to the success of the model in facilitating change in EIs' practice. These factors relate both to the structure of the PD model and the training and the implementation of the approach prior to the study. First, the processes and materials used by the peer coaches had been field-tested in years prior to the experimental study during the installation of the

model statewide. The use of feedback, reflection, and problem-solving during job-embedded practice opportunities within the model was designed to align with recommended practices in PD in early childhood (Dunst, 2015; Snyder et al., 2011, 2018) and was informed by theories of adult learning (Knowles et al., 2005).

Consistent with IS models, peer coaches used fidelity measurement tools to coach EIs during feedback sessions according to a defined protocol (Odom et al., 2014). They also offered coaching support to the EIs on their fidelity of implementation of SS-OO-PP-RR as a coaching approach with families. EIs too, measured their own implementation as they watched their videos in TORSH and they jointly set goals with their coach to define specific changes that they intended to make. Together, the two types of fidelity ensured that both the coaching *to* EIs was delivered as intended, and that coaching of families *by* EIs was delivered as intended. Because coaches were trained to use these fidelity measures with the EIs they were coaching, they were able to monitor areas in which EIs needed support as well as areas in their own coaching that required focused attention. Taken together, these components increased the likelihood of supporting caregiver–child interactions in meaningful family routines.

Third, the PD that took place was part of a state-supported, job-embedded model. The state's Part C program adopted FGRBI as an approach to supporting families in previous years and had built-in opportunities for EIs to access ongoing PD year upon year. In addition to the peer coaches in this study, six other regions were conducting a similar PD sequence with EIs in their own regions. As such, EIs had already heard of the approach (although they had not yet received support), and they knew that the model would continue to be used after the study ended. These features, a focus on fidelity at multiple levels, and a PD approach that is built with attention to best practices in PD are features that could also support other content and service delivery areas throughout the educational system.

Weighing Costs and Benefits

Programs in early childhood and in school age educational settings carefully weigh costs and benefits when choosing and installing PD approaches (Romano & Schnurr, 2020). The approach examined here offers evidence of effectiveness, but it is also important to underscore the training time and associated costs needed to achieve the results, and how these costs may be integrated into real-world systems. In this study, "costs" include the coaches' training time, which were distributed over the course of 2–3 years prior to the study and implementation time. During the study, coaches spent about 2 hrs per week across the month throughout the intervention. Time was spent on video review and annotation, preparing coaching sessions, and conducting coaching sessions. Costs also include the EIs' time in PD, which was roughly equivalent to 1–2 hr per week. In Sites 1 and 2, the study was conducted within a relatively short time frame of about 4–5 months. The timeline for Site 3 was longer because of the time between home visits. Benefits to the EIs are evidenced by the experimental data, which show gains in implementing the model that was adopted by the state agency.

It is also important, in the context of PD in Part C service delivery, to consider the implications of the findings for families. As EIs become more skilled at using capacity-building coaching models, caregivers gain more support in using strategies in their everyday routines with their child, they actively problem solve and reflect to generate ideas for how to better support their child, and they receive positive, specific feedback to boost their feelings of confidence (Douglas et al., 2019; Salisbury et al., 2018). Children, by extension, are likely to experience richer and more frequent interactions that support their development (Trivette et al., 2010). In this study, half of the participant families used social services to meet food security and health care needs. While EIs report that coaching families who are facing crises or complex life circumstances is challenging (Meadan et al., 2018), EIs in this study implemented the model with families who had very limited economic resources as well as with families who had greater resources. The distal child outcome measure also offers preliminary evidence that children make gains while their EIs use the model. It is worth noting that child outcomes are reported descriptively, not as experimental data.

Limitations and Future Research

This study faces limitations that should be noted. First, while we collected data across two families, we did not gather generalization data on how EIs used FGRBI with families who were not a part of the coaching feedback sessions with their peer coach. We were also unable to gather maintenance data on all EI participants due to their time constraints and children who were beginning to transition out of Part C services. Future studies could examine how long the effects of the PD were maintained, and how well EIs generalized the skills to new families.

We also note that while we used a single case, multiple probe design, there were breaks in data collection in some providers between phases. These gaps represented breaks in the EIs' service delivery to families for reasons like illnesses, winter weather, and travel. This should be noted as a limitation that could affect the internal validity of the results, although these gaps were typically limited to changes between the baseline and module phase. These breaks in practice opportunities, however, should be anticipated in planned PD activities, and programs could

build in the ability to support EIs' implementation across a number of families to avoid this issue. It is also important to note that, in this analysis, we did not report on changes to caregiver implementation of strategies. This is an important area of future study that will be analyzed in future works.

This study took place within a state that had adopted FGRBI for statewide service delivery and it had been employing an IS approach to installing and scaling up the use of the approach. While this does not narrow the relevance of the findings, it is an important contextual feature that might influence whether these findings are replicable without similar system-level characteristics in the background. While we presented data from several sites within three replications each, it is important to continue to explore the impact of the approach on EI, family, and child level data in large-scale randomized controlled trials. Future PD studies in EI might manipulate the coaching dosage to identify the dosage needed to reach fidelity of implementation when bringing PD models to scale.

Conclusion

Caregiver coaching in EI is a complex service delivery model that supports a family's ability to engage in meaningful interactions with their child during a critical developmental period (Meadan et al., 2018; Romano & Schnurr, 2020; Schertz et al., 2011). While complex, the combination of direct content, practice opportunities, and PD from a trained peer coach led to changes in the implementation of coaching practices that support families in EI. This study offers initial evidence supporting the use of internal peer coaches as competency drivers in EI programs. With a continued emphasis on PD in community-based contexts, EIs can learn new ways to enhance early caregiver-child interactions by supporting families within Part C services.

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Supplemental Material

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