

Examining Caregivers' Independence in Early Intervention Home Visit Sessions

BY

ANTONELA CIUPE

B.S., University of Illinois, 1999

M.S., Erikson Institute, 2010

THESIS

Submitted in partial fulfillment of the requirements
for the degree of Doctor of Philosophy in Special Education
in the Graduate College of the
University of Illinois at Chicago, 2017

Chicago, Illinois

Defense Committee:

Dr. Christine L. Salisbury, Chair and Advisor
Dr. Lisa S. Cushing
Dr. Daniel M. Maggin
Dr. Marie Tejero Hughes
Dr. Theresa A. Thorkildsen, Educational Psychology

ACKNOWLEDGMENTS

I owe thanks to so many people who have made this journey possible. First, I'd like to show my gratitude to my advisor, Dr. Chris Salisbury, the best advisor I could hope for. Chris, you have always given me the guidance and resources I needed, when I needed them, and supported me to get to the finish line. Thank you for challenging me to dig deeper and for pushing me to work hard and move forward with my research topic. To my committee members - Drs. Lisa Cushing, Dan Maggin, Marie Tejero Hughes, and Theresa A. Thorkildsen – thank you for your thoughtful feedback and insights that helped me shape this dissertation. Our conversations have fueled my passion for exploring new territory, and for this I am grateful.

Thank you to Drs. Juliann Woods, Patricia Snyder, and, again, Chris Salisbury, the investigators of the EPIC project, for providing me with a wealth of data to dig through, and an opportunity to contribute to this project. To Gina Braun, Elizabeth Cambray-Engstrom and Deborah Faermark who have helped me code the data – a huge thank you for your diligent work, attention to detail, and optimism. To the families and children who participated in the EPIC project – thank you for your contribution to early intervention research.

To my doctoral peers Dr. Lindsay Athamanah, Dr. Cindy Collado, Dr. Allison McGrath, Kierstin Modelmog, and Agata Trazka – thank you for your endless support, enthusiasm, and humor. Your friendship throughout these years has inspired me and gave me strength to finish this race.

To my family who has been close to me even from thousands of miles away, thank you for your unconditional love and approval. My father always encouraged me to learn and pursue my dreams, and if he were with us today, he would have been proud of me. My mother's dedication and strength has inspired me to work hard to achieve my goals. To my sister Adina,

thank you for your wholehearted support; your long and so valuable presence by our parents' side in the most difficult of moments were a great comfort, while I was far away, working on my dissertation. Finally, to my partner, Andrew, who was my biggest supporter from day one, thank you for your endless encouragement, love and passion for my work. I couldn't have done this without you.

I am looking forward to the next chapters in my life! The best is yet to come!

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LIST OF ABBREVIATIONS

DV	Dependent Variable
EI	Early Intervention
EPIC	Embedded Practices and Intervention with Caregivers
IGDI	Individual Growth and Development Indicators
IV	Independent Variable
PICCOLO	Parenting Interactions with Children: Checklist of Observations Linked to Outcomes
SOOPR	Setting the stage, Observation and Opportunities to practice, Problem solving and reflection, and Review.

SUMMARY

In recent years, the field of early intervention (EI) has had to cope with a significant increase in the number of children with developmental delays. Given the realities of reduced funding for services and the forthcoming prevalence of children with significant delays, it is even more important to build proficient and independent caregivers. Coaching is the primary mechanism for advancing caregiver capacity in home-based EI sessions; however, little is known about its potential to support caregivers to independently use development-enhancing behaviors associated with positive child outcomes including teaching, responsiveness, encouragement, and affection. Moreover, researchers and providers lack evidence regarding which coaching strategies are best suited to build caregiver independence.

Data from a single case multiple baseline across participants study collected through an IES Goal 2 intervention development study (Woods, Salisbury, & Snyder, 2013) were used to examine how a delineated coaching process affected the ability of caregivers to take the lead in promoting their children's learning in the context of daily activities. In addition, the elements of coaching that correspond to caregiver initiations of development-promoting behaviors were investigated. One EI provider coached four culturally diverse caregivers to use development-enhancing strategies with their children who evidenced moderate-severe disabilities. The coaching process designated by the acronym SOOPR, include targeted information sharing (S), observation and provision of opportunities for the caregiver to practice new skills with provider feedback (OO), problem solving and reflection (P), and review of the EI session (R).

Results reveal that all four caregivers increased their initiations of three of four development-promoting behaviors: teaching, responsiveness, and encouragement. The descriptive data across sessions for each triad suggest that as the intervention progressed, the

frequency of specific coaching strategies decreased and this may have fostered the caregivers' opportunities to take the lead in the sessions. In addition, a consistent pattern of direct proportionality between caregiver rate of improvement after the intervention and caregiver initiations during the intervention was also identified. No consistent patterns were found between specific or individual coaching strategies and caregiver initiations. Taken together, findings from this investigation support the overall value of the SOOPR coaching framework and its effectiveness for teaching caregivers to identify learning opportunities and embed interventions strategies in various contexts. Study limitations and implications for research and practice are discussed.

I. INTRODUCTION

Statement of the Problem

In the past decade, largely due to policy and research forces, the field of early intervention (EI) has shifted its focus from clinic to home-based services and from provider-led to family-centered practices (Bruder, 2010; Division for Early Childhood, Council for Exceptional Children [DEC], 2015; Dunst, 2012). Research has supported these policy-based changes by demonstrating how positive child outcomes accrue when EI providers use practices that enhance caregivers' capacity to advance their children's learning and development (Dunst, Trivette, & Hamby, 2007a, 2008; Swanson, Raab, & Dunst, 2011). The primary mechanism for building caregiver capacity in home-based EI sessions is a graduated teaching and learning process called caregiver coaching (Friedman, Woods, & Salisbury, 2012; Rush & Shelden, 2011; Salisbury, Woods, & Copeland, 2010; Woods, Wilcox, Friedman, & Murch, 2011). Caregiver coaching involves the use of a variety of practices designed to facilitate caregivers' active participation and can result in enhanced caregiver competence and confidence in teaching their children. Providers who employ a coaching approach are intentional about fading their assistance and promoting caregivers' capacity to take the lead in home-visit sessions. Advocates of coaching suggest that having caregivers take the lead during EI sessions may be linked to building their capacity to use development-promoting behaviors between home visits and in contexts outside the home (Basu, Salisbury, & Thorkildsen, 2010; Friedman et al., 2012).

Three types of caregiver behaviors have been empirically associated with positive child outcomes: those that promote the child's learning (i.e., teaching and responsiveness), those that support the caregiver's relationship with the child (i.e., encouragement and affection), and those that enhance caregiver knowledge and skill about child learning (i.e., gathering and sharing

information) (Bornstein, 2005; Innocenti, Roggman, & Cook, 2013; Roggman, Cook, Innocenti, Jump Norman, & Christiansen, 2013). Although research indicates that coaching practices in the aggregate promote the ability of caregivers to independently use teaching strategies (e.g., Kashinath, Woods, & Goldstein, 2006; Peterson, Carta, & Greenwood, 2005), little is known about which specific coaching practices impact a caregiver's ability to use these three types of development-enhancing caregiver behaviors. Furthermore, remarkably little data exist about how coaching impacts the caregiver's continuing use (i.e., maintenance) of these same development-enhancing behaviors in the absence of the provider or in different contexts (i.e., generalization). Moreover, researchers and providers lack specific evidence regarding which coaching strategies are best suited to build caregiver capacity to take the lead during intervention sessions (Friedman et al., 2012; Woods et al., 2011). These research gaps formed the basis for the current study.

Building an evidence base about the potential value and impact of coaching is important given emerging research and policy requirements for its use. Research about coaching is particularly urgent in light of studies that indicate that providers tend to use practices that are child focused rather than caregiver focused in their home-visit sessions (Campbell & Sawyer, 2007; Fleming, Sawyer, & Campbell, 2011; Peterson, Luze, Eshbaugh, Hyun-Joo, & Kantz, 2007), or believe they are engaged in coaching when they are not (Brorson, 2005; Salisbury, Cambray-Engstrom, & Woods, 2012). As a result, providers may utilize practices that do not intentionally coach the caregivers, even when seeking to enable caregiver independence, or at best, may apply an array of coaching strategies that may or may not work to foster caregiver competence. No studies have been reported that examine the association, in home-based sessions, between coaching and the caregiver's unprompted use of all three development-

promoting behaviors noted above. Furthermore, no research has emerged that identifies which coaching strategies work best for achieving caregiver independence. These gaps in the research literature may be one reason for the poor adoption of coaching in the field of EI (Campbell & Sawyer, 2007; Fleming et al., 2011). This study sought to extend the field's knowledge about caregiver coaching by addressing these gaps in the research literature.

Focus of the Study

There is a clear need for research that measures the impact of the coaching process on caregivers' independence and identifies the particular strategies that are more likely to support caregivers to become self-sufficient in supporting the development of their children. This study sought to determine: (a) the extent to which specific coaching practices foster the caregiver's ability to take the lead in EI sessions and (b) the extent to which specific coaching practices foster the caregiver's ability to take the lead in the absence of the EI provider. Results of this investigation may strengthen the argument for the use of coaching as a means to build self-sufficient and effective caregivers, while guiding EI providers in selecting the most useful strategies to use in achieving that goal. It may then be more likely that EI providers will be better prepared to support caregivers in their role of fostering child learning and development in the presence or absence of the EI providers.

Conceptual and Theoretical Framework

Emphasis on the caregiver-child relationship represents a paradigm shift from viewing the caregiver as a passive observer in child-centered interventions to a family-centered service delivery model focused on strengthening caregivers' capacity to competently and confidently promote their children's development. The caregiver's ability to take the lead in EI sessions – a hallmark of coaching-based interventions – draws upon family-centered principles (Shelton,

1987), adult learning theory (Knowles, Holtan, & Swanson, 2005), and notions of capacity building (Brickman et al., 1982; Bronfenbrenner, 1979; Dunst & Trivette, 2009a; Gottlieb, 1981; Rappaport, 1981). Taking the lead in a home-visit session requires caregiver competence, confidence, and initiative. These characteristics emerge through an intentionally delivered coaching process offered by the EI provider.

Family-centered principles. To successfully coach caregivers, EI providers need to adopt a family-centered approach to practice. Family-centered practices are based on a blend of theoretical approaches that emphasize the strategies that scaffold caregiver learning in natural family settings and routines (Brown & Palincsar, 1989; Vygotsky, 1978). Ideally, providers focus on working with caregivers, with the expressed goal of having parents lead the activities in the session (McCollum & Yates, 1994; Woods & Lindeman, 2008). Family-centered principles are reflected in professional practice guidelines (DEC, 2015) and federal special education policy (Amendments to the Individuals with Disabilities Education Act, IDEA, Section 631, Part C).

Adult learning theory. Providers also need to draw on adult learning theory, which posits that the learning process is more effective when the adults participate actively in that process and interact with materials that are relevant to their lives and when they have the opportunity to apply their knowledge to real-world contexts (Lave & Wenger, 1991). If adults learn best when the content addresses their needs, providers will need to gather information about what the caregivers need to learn and the routines that can serve as contexts for intervention. Also, as described in naturalistic and metacognitive learning paradigms (Dewey, 1933; Killion & Todnem, 1991; Noonan, 2014; Van Manen, 1977), EI providers need to give caregivers opportunities to actively practice new behaviors and strategies, support caregivers in

reflecting on their practices, and assist them in transferring the information and skills learned in the sessions to other contexts that are meaningful for their children and their families.

Capacity-building paradigm. The capacity-building paradigm reflects key elements of the social systems (Bronfenbrenner, 1979), empowerment (Rappaport, 1981), family strengths (Stinnett & DeFrain, 1985), social support (Gottlieb, 1981), and help-giving (Brickman et al., 1982) theories. In the context of EI, capacity building is seen as a process through which families acquire knowledge, skills, and resources that enhance existing strengths and foster the development of new skills in a way that bolsters parenting self-efficacy beliefs (Bandura, 1977; Dunst & Trivette, 2009a). Caregivers' active participation in the process of learning plays a critical role in strengthening their competence and confidence. Therefore, to foster caregivers' competence and confidence, EI providers need to use caregivers' existing strengths as a foundation for building new abilities. In addition, they need to share information, explain and demonstrate strategies, and provide caregivers with opportunities to practice new skills. As caregivers become more familiar with intervention strategies, EI providers reduce their involvement and doing so affords caregivers opportunities to have more "hands on experience" with their children and take the lead in EI sessions. Transitioning from provider-directed activities, such as demonstration, to caregiver-directed involvement and independent demonstrations of development-promoting strategies allow caregivers to become confident and competent in supporting their children's learning (Dunst & Trivette, 2009b).

These three frameworks formed a suitable conceptual and theoretical basis for the current study because they capture the power of coaching to empower caregivers to take the lead in EI sessions. Additionally, they provide a foundation for understanding the process of coaching and

the association between coaching strategies and caregivers' use of developmentally supportive behaviors.

Limitations of Extant Research

Recent investigations have mainly focused on characterizing and quantifying the coaching strategies used by EI providers (Cambray-Engstrom & Salisbury, 2010; Colyvas, Sawyer, & Campbell, 2010; McBride & Peterson, 1997; Salisbury et al., 2012; Salisbury et al., 2010; Sawyer & Campbell, 2009), defining the strategies employed by providers in a coaching-based session (Friedman et al., 2012), and describing the impact of parent-implemented interventions on child and family outcomes (Kemp & Turnbull, 2014; Kong & Carta, 2013; Roberts & Kaiser, 2011; Salisbury & Copeland, 2013). While these studies contribute to a deeper understanding of coaching practices and their elements, they do not explore the extent to which specific coaching practices build caregivers' capacity to take the lead in home-visit sessions.

Research Variables of Interest

Building the caregiver's capacity to take the lead in an EI session implies two complementary sets of behaviors: (a) what the provider does during the coaching process that supports caregiver independence and (b) what the caregiver does to maximize his or her child's developmental potential. These are the two independent (coaching) and dependent (caregiver behaviors) variables that were measured in this study.

Provider coaching. Two skill sets are required for effective coaching: (a) knowledge about and ability to provide effective evidence-based practices that promote child skill acquisition in various developmental domains, and (b) adult learning principles (Woods et al., 2011). The first set of competencies requires the service provider to identify the child's strengths

and needs, and provide information about specific strategies that support the child to acquire critical functional skills. The second skill set requires EI providers to learn about families' goals and priorities, and support how caregivers integrate various strategies into their daily routines. EI providers need to create opportunities for family members to strengthen their existing caregiving abilities and promote the development of new competencies that are needed for maximizing their children's potential (Dunst & Trivette, 2009a). By integrating these two skill sets, EI providers support caregivers in becoming more competent to help their children learn, as well as more confident in their ability.

Caregiver behaviors. Caregiver behaviors have long been the focus of home-visit programs and are associated with positive outcomes in young children at risk for or with developmental delays. Studies have found that multiple types of caregiving behaviors contribute to optimal child development across several domains (multifinality) and that a specific child development outcome is associated with several parenting qualities (multicausality) (Guralnick, 2005; Roggman et al., 2013). For example, a caregiver who encourages exploration and learning fosters a child's early cognitive, communication, and social-emotional skills, as well as academic success and behavioral regulation later on (Bradley et al., 1989; Chazan-Cohen et al., 2009). Similarly, a child's secure attachment is associated with caregiving qualities that are characterized by responsiveness, affection, and encouragement (Landry, Smith, & Swank, 2006). An emerging consensus in the field indicates that developmentally supportive caregiver behaviors can be placed in three categories: those that foster child learning (teaching and responsiveness; Roggman et al., 2013), enhance caregiver-child relationship (affection and encouragement; Roggman et al., 2013), and direct resources (gathering and sharing information; Dunst & Trivette, 1988). It is crucial that caregivers intentionally and systematically use all

three of these behavior categories in order to influence their children's development on multiple levels.

Embedded Practices and Intervention with Caregivers (EPIC)

This investigation relied on data collected as part of a multi-site intervention development project — *Embedded Practices and Intervention with Caregivers (EPIC)*. The EPIC intervention was funded to develop, test, and evaluate a caregiver-implemented intervention for infants and toddlers with moderate to severe developmental delays and their families. The goal of the EPIC intervention is to enhance caregivers' relationships with their children and their ability to promote their children's learning through embedded, naturalistic instructional strategies in child and family routines and activities. To support responsive caregiver-child interactions and promote child learning, the EI provider provides teaching and information to the caregiver using specific, evidence-based coaching practices (cf., Friedman et al., 2012). These coaching practices, designated by the acronym SOOPR, include targeted information sharing (S), observation and provision of opportunities for the caregiver to practice new skills with provider feedback (OO), problem solving and reflection (P), and review of the EI session (R).

The second component of the EPIC approach involves a five-question (5Q) framework that coaches use to teach caregivers when and where they can embed intervention (instruction) across the day, what is taught and why, how intervention occurs, and how to evaluate if the intervention is working. This component has been found to have high appeal and utility to caregivers in learning how to embed interventions within everyday activities and routines (Salisbury et al., 2017).

A final unique feature of EPIC is its front-loading approach, consisting of an increased number of home visits (three per week) during the initial phase to support caregivers' acquisition

of the intervention, and then gradually reducing the number of sessions to once a week. Front-loading utilizes the concept of dosing/up-take from the medical field and was hypothesized to be important in helping caregivers “get the idea” of the EPIC intervention more quickly than might otherwise occur with traditional, weekly home visits (Warren, Fey, & Yoder, 2007).

Purpose of This Study

Several studies and research syntheses have determined that interventions using coaching have a positive impact on caregiver and child outcomes (Dunst & Trivette, 2009a; Dunst et al., 2007a; Kemp & Turnbull, 2014). However, little is known about which elements of the coaching process facilitate caregivers' self-sufficiency. Additionally, research has emphasized the importance of actively engaging caregivers in EI sessions, but this may not be sufficient to promote caregivers' independence, which is the ultimate goal of coaching (Friedman et al., 2012; Knowles et al., 2005; Trivette, Dunst, & Hamby, 2010). Supporting caregivers to take the lead in EI sessions appears to be an important feature of coaching that may enable caregivers to use the skills learned in the sessions between home visits and in new contexts. Research in this direction is especially important because it can help EI providers understand the impact of coaching strategies on caregivers and the extent to which they are promoting caregivers' self-sufficiency.

This study addressed the following research questions:

1. Is there a functional relation between the use of coaching strategies and an increase in caregivers' initiations of development-promoting behaviors including teaching, responsiveness, affection, and encouragement?
2. Which coaching behaviors correspond to an increase in caregivers' initiations of development-promoting behaviors including teaching, responsiveness, affection,

encouragement, and gathering and sharing information in EI home-based sessions?

II. LITERATURE REVIEW

The purpose of this study was to examine the extent to which coaching affects caregivers' ability to take the lead in early intervention (EI) sessions. This study was situated at the intersection of two bodies of EI research: embedded intervention and caregiver coaching. This review of the literature begins with operationalizing the terms *embedded intervention*, *coaching*, and *taking the lead*, followed by a synthesis of research on embedded intervention. Finally, I summarize the gaps in the current body of research, highlighting the lack of evidence showing the impact of coaching on independent caregiver behaviors associated with positive child outcomes. I conclude by showing how the current study can address this gap and advance the field's understanding about how caregiver independence in home-visit sessions can be impacted.

Definitions of Terms

Embedded Intervention. A major focus in EI is to provide sufficient learning opportunities for young children with disabilities so that they learn skills that help facilitate their participation in everyday activities. Participation in families' routines and activities is important for infants and toddlers because these contexts provide numerous learning opportunities for the acquisition of essential developmental skills (Dunst et al., 2001; Dunst, Hamby, Trivette, Raab, & Bruder, 2000; Göncü, 1999; Wilcox & Woods, 2011). Activities and routines like diaper change, meal time, sorting laundry, reading books, and playing with toys set the occasion for children to practice targeted skills, such as using gestures or words to communicate their wants and needs, or crawling/walking to explore their environments. Embedding intervention in a variety of activity settings has been associated with increases in child participation and acquisition of desired learning outcomes (e.g., Brown & Woods, 2015; Dunst et al., 2001; Rakap

& Parlak-Rakap, 2011; Snyder, Hemmeter, McLean, Sandall, & McLaughlin, 2013; Snyder et al., 2015; Wetherby & Woods, 2006; Wetherby et al., 2014).

Embedded intervention involves a set of evidence-based, recommended practices in early childhood intervention. It aims to support children's learning in natural environments (DEC, 2015) and is defined as "providing intentional and systematic instructional episodes within and across activities based on children's individualized learning needs and outcomes" (Snyder et al., 2015, p. 70). Embedded intervention is often linked to similar instructional approaches in early childhood special education such as routine-based intervention, activity-based instruction, naturalistic teaching, incidental teaching, milieu teaching, and enhanced milieu teaching (Snyder et al., 2013; Snyder et al., 2015). Despite different labels, these teaching approaches and sets of practices share several common characteristics including: (a) teaching and learning that occur in the context of typical daily activities; (b) instruction focused on teaching skills that are essential for children to function in daily activities and routines rather than an isolated skill; (c) use of a variety of systematic instructional strategies designed to support children's unique needs (e.g., environmental arrangement, wait time, responsive strategies, prompting systems); and (d) the adults who use the intervention strategies are those who spend time with the children on a regular basis (Snyder et al., 2013; Snyder, Hemmeter, & Fox, 2015). Given their demonstrated value in advancing child learning and functioning in natural environments across all developmental domains, and the acquisition of preacademic skills (Rakap & Parlak-Rakap, 2011; Snyder et al., 2013; Snyder et al., 2015), embedded intervention approaches started to be used in the past decade in conjunction with coaching practices (e.g., Brown & Woods, 2015; Kashinath et al., 2006; Woods, Kashinath, & Goldstein, 2004).

Coaching. The process of coaching has been extensively used in many fields to advance the knowledge and skills of the person being coached (Knight, 2008). In early childhood special education, coaching is used to enhance the competence of teachers to implement evidence-based instructional practices that lead to positive outcomes for children (e.g., Fox, Hemmeter, Snyder, Binder, & Clarke, 2011; Snyder et al., 2015). Unlike the dyadic model used in early childhood education in which a coach supports a teacher (e.g., Wilson, Dykstra, Watson, Boyd, & Crais, 2012), coaching in EI is based on a triadic approach to service delivery in which a provider supports the caregiver-child relationship (Rush & Shelden, 2011; Salisbury et al., 2010; Woods et al., 2011). Coaching practices in EI promote caregivers' active participation in meaningful activities during the intervention so that caregivers become competent and confident to independently use development-promoting strategies in the absence of the provider.

Coaching is a dynamic process in which adults work together as partners (Campbell & Halbert, 2002; Rush & Shelden, 2011; Salisbury et al., 2010; Woods et al., 2011). In this collaborative partnership, adults' behaviors and roles change in response to interactions among the triad's participants (i.e., caregiver, child, and EI provider; Basu et al., 2010). The roles and behaviors associated with coaching vary in complexity and frequency of use. Adults assume roles as both teachers and learners. These roles do not imply a hierarchical relationship, but rather involve a partnership in which both the EI provider and the caregiver bring knowledge and skills to the session (Hanft, Rush, & Shelden, 2004). As a teacher-coach, the service provider initiates a variety of coaching behaviors and strategies, such as engaging the caregiver to identify the child's learning targets, providing information about caregiving behaviors that impact child development, and guiding the caregiver to embed corresponding strategies in real-life contexts. In turn, caregivers also act as teachers in EI home-visit sessions by providing information about

their children's strengths and interests, their families' daily routines, and their children's progress, as well as by teaching their children various functional skills. This bidirectional teaching and learning process increases the caregiver's competence to become self-sufficient in supporting children's learning.

Taking the lead. A desirable outcome of EI is to equip caregivers with knowledge and skills that enable them to use strategies that have been shown in research literature to promote child development. Coaching has been identified as the primary means of building caregivers' capacity (Dunst & Trivette, 2009b). To ensure caregivers' ability to perform development-promoting behaviors between EI sessions and to embed their newly acquired knowledge and skills in various contexts, it is critical that EI providers actively engage caregivers in the teaching and learning process and, moreover, foster their ability to take the lead in EI sessions. The definition of *taking the lead* that I present here has emerged from research on positive parenting interactions linked to child outcomes (Innocenti et al., 2013; Roggman et al., 2013) and triadic interactions observed in EI sessions (Salisbury & Cushing, 2013). Roggman, Innocenti, and their colleagues emphasized that teaching, responsiveness, encouragement, and affection are caregiver behaviors that are associated with multiple child outcomes and should be included in EI's family-centered practices (Innocenti et al., 2013). The positive caregiving approach proposed by Roggman and colleagues aligns with EI principles in that EI providers "work through the parent-child relationship to support the parent in the role of promoting the child's development" (Innocenti et al., 2013, p. 309).

Salisbury and Cushing (2013) examined the interactions within coaching-based and provider-led EI sessions and characterized them in terms of form (who is leading), function (what the actor is doing), and focus (who is being acted upon). Relevant to the definition of

taking the lead is their notion of form, which is defined as the actor who leads or shapes the interaction. In other words, the adult who initiates, unprompted, a particular behavior or interaction of interest with the child is considered to be “in the lead.” These initiations of development-promoting behaviors are included in the scope of my definition of *taking the lead*. To these, I added caregivers’ eliciting information and feedback about child development or intervention strategies. The ability to seek information allows the parent to learn and correctly implement the strategies across different contexts, thus becoming self-sufficient with the child (Dunst & Trivette, 2009a; Woods & Lindeman, 2008).

For the purposes of this study I defined caregivers’ taking the lead as caregivers’ independent initiation of behaviors. These behaviors reflect the means by which caregivers promote their children’s learning (teaching and responsiveness), enhance their relationships with their children (encouragement and affection), and facilitate their acquisition of essential development-enhancing information (seeking information and feedback about child development or intervention strategies).

Embedding Intervention in Families’ Daily Routines and Activities

Embedded instruction has been used for a number of years in preschool settings to support the learning needs of children with various disabilities and developmental delays (Rakap & Parlak-Rakap, 2011; Snyder et al., 2013; Snyder et al., 2015). The use of embedded intervention with infants and toddlers in home-based settings is in the emerging stage.

The purpose of the following section is to examine the extent to which caregiver-implemented interventions have proactively sought to build caregivers’ independence to embed learning opportunities in their families’ daily routines and activities so that their infants and toddlers with disabilities might acquire functional skills.

Method. Peer-reviewed studies were identified through a two-step process. First, PsychINFO and ERIC databases were searched using the following terms: (a) *embed** and *children with disabilities/infants and toddlers and parent*; (b) *naturalistic instruction/teaching/intervention* and *children with special needs/infants and toddlers with special needs/children with disabilities*. The terms *activity-based*, *enhanced milieu teaching*, *milieu teaching*, and *learning opportunities* were also included in the search because these terms have been reportedly used in the research literature to refer to embedded intervention (Snyder et al., 2015). This search generated 340 studies. Second, studies that met the following inclusionary criteria were selected: (a) the researcher(s) used the term *coaching* to describe the practices used to teach caregivers, (b) participants included caregivers and infants/toddlers with disabilities, (c) included at least one child participant aged 3 years or younger with disabilities, (d) the study used an experimental design and the dependent variable included caregiver behaviors, and (e) the intervention was entirely implemented in the home. Ten studies that met the inclusionary criteria were identified.

Information regarding 20 variables from each study was extracted and organized within six categories: (a) characteristics of participants, (b) fidelity measurement, (c) caregiver skill maintenance and generalization, (d) coaching components, (e) context of coaching, and (f) caregiver outcomes. The 20 variables within these categories were selected to allow for a systematic examination of practices used to support caregiver self-sufficiency.

Characteristics of participants. A total of 272 caregivers and their children were included in these 10 studies. Participants' demographic information and characteristics are presented in Table 1. Children with a wide range of disabilities received interventions delivered by caregivers including children with very low birth weight, autism spectrum disorder,

developmental delays, language delays, Down syndrome, and behavior challenges. Half of the studies included in this review provided intervention for children with autism spectrum disorder. Other systematic reviews and meta-analyses reported similar findings about the characteristics of the children participating in caregiver-embedded interventions (e.g., Barton & Fettig, 2013; Kemp & Turnbull, 2014; Rakap & Parlak-Rakap, 2011; Snyder et al., 2015). In addition, findings show that in the last decade caregiver-embedded interventions have predominantly focused on children with autism spectrum disorder (Barton & Fettig, 2013; McConachie & Diggle, 2007).

Demographic information about the racial composition of the sample was reported in only six of the 10 studies. In these six studies, 39.49% of the caregivers were Caucasian, 29.23% were Hispanic, 26.6% were African American, 0.51% were Asian, and 4.10% were not specified. Most of the minority caregivers ($n=166$) in the sample were identified in studies conducted by Landry, Smith, Swank, and Guttentag (2008) and Landry, Smith, Swank, Zucker, Crawford, and Solari (2012). The remaining studies reporting caregiver race included predominantly Caucasian participants. Household income was reported for only 39 of 272 participants. Of these 39 participants, 95% ($n=38$) earned household incomes of less than \$60,000 and 5% ($n=1$) earned \$65,000 to \$85,000. Thirty-six of the 39 participants were found in the Solomon, Van Egeren, Mahoney, Huber, and Zimmerman (2014) study. Caregivers' levels of education were reported for 233 of 272 caregiver participants across the 10 studies. Education levels across these 10 studies were 27% ($n=63$) with some college or higher, and 73% ($n=170$) high school graduates.

Given that several studies did not provide sufficient information about their participants, a complete racial and socio-economic profile of the families participating in the reviewed studies could not be captured. This finding is consistent with previous reviews of parent-implemented

interventions (e.g., Barton & Fetting, 2013; Robertson, Sobeck, Wynkoop, & Schwartz, 2017).

Demographic information is important to determine to what extent an intervention may be effective for other populations. In particular, external validity is essential in interventions delivered by caregivers since their effectiveness is likely to vary based on caregiver characteristics such as educational level or cultural background (Calzada, Basil, & Fernandez, 2012; Forehand & Kotchick, 1996).

Table 1
Caregiver and Child Information

Design type	Reference	Caregiver Education	Household Income	Caregiver Race	Child Disability	Child Race
SCD	Brown & Woods (2015)	College or higher = 7 2-year degree = 1 High School = 1	N/R	C = 7 AA = 1 H = 1	DS =4; ASD=3 DD = 2	C = 7 AA = 1 H = 1
	Kashinath, Woods, & Goldstein (2006)	High school or associate degree = 5	N/R	N/R	ASD=5	N/R
	Meadan et al. (2016)	College or higher= 3	10,000-25,000=1 25,000 - 45,000=1 65,000-85,000=1	C = 3	LD=3	C = 3
	Peterson, Carta, & Greenwood (2005)	High school =3	Low income	Minority= 3	LD=3	Minority=3
	Vismara, Young, & Rogers (2012)	N/R	Middle class	C = 9 H = 1	ASD=10	N/R
	Ware, McNeil, Masse, & Stevens (2008)	N/R	N/R	N/R	BC=5	C = 4 MR = 1
	Woods, Kashinath, & Goldstein (2004)	College = 4	N/R	C = 3 A = 1	DD= 2 LD= 2	C = 3 A = 1
	Landry, Smith, Swank, & Guttentag (2008); Landry et al. (2012)	High school = 166	upper lower-lower middle	C = 64 H = 55 AA = 42 O= 5	VLBW=166	N/R
	Solomon, Van Egeren, Mahoney, Huber, & Zimmerman (2014)	College or higher = 34	<60,000 = 36	N/R	ASD=64	C= 45 O = 19

Welterlin, Turner-Brown, Harris, Mesibov, & Delmolino (2012)	College or higher = 9	N/R	N/R	ASD=10	C = 9 O = 1
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Note: C= Caucasian, AA = African American, H = Hispanic, MR = multi-racial, O = Other, DS = Down syndrome, ASD = Autism Spectrum Disorder, LD = Language Delay, BC = Behavior Challenges, VLBW= very low birth weight, N/R = not reported

Fidelity measurement. Two fidelity practices are of concern in caregiver-implemented interventions: implementation fidelity (the coaching strategies used to support the implementation of the intervention) and intervention fidelity (caregiver use of the newly learned strategies). These practices which play a critical role in the effectiveness of an intervention (Fixsen, Naoom, Blasé, Friedman, & Wallace, 2005) may also impact caregivers' ability to confidently take the lead in intervention sessions. High-fidelity implementation of coaching practices (implementation fidelity) often results in high-fidelity implementation of evidence-based practices by caregivers (intervention fidelity) which, in turn, generate positive child outcomes. A few researchers (e.g., Peterson et al., 2005) used caregiver unprompted (independent) use of intervention strategies as a performance criterion to determine intervention fidelity and caregiver skill mastery (e.g., a caregiver mastered a teaching strategy if she demonstrated at least 10 independent uses across three sessions). Thus, caregivers who attain high fidelity levels have an increased likelihood of initiating development-promoting behaviors with a higher frequency during the EI sessions, and this may boost their confidence to support their children's learning in the absence of EI providers.

Only half of the studies included in this review measured both types of fidelity practices, and of these studies only Brown and Woods (2015) measured and reported interobserver agreement (IOA) for both implementation and intervention fidelity. Improvements in caregiver use of strategies (intervention fidelity) are hypothesized to result from high-fidelity coaching (implementation fidelity); both types of fidelity are empirically associated with improved child outcomes (Fixsen et al., 2005; Strain & Bovey, 2011; Vernez, Karam, Mariano, & DeMartini, 2006). Thus, both implementation and intervention fidelity should be measured and reported. In

addition, IOA should be reported to demonstrate the reliability and validity of findings, and to maintain scientific integrity (Gast & Ledford, 2009).

Table 2

Practices that Support Caregiver Independence

Reference	Fidelity	Caregiver maintenance	Caregiver generalization	Coaching practices	Context of coaching	Caregiver outcomes
Brown & Woods (2015)	Implementation (IOA=95.4%) and Intervention fidelity (IOA=94.9%)	1 and 3 months post intervention		a, b, c ^{a,b} , d, e, f, g, h, i ^a , k, l	Across routines	Improved ability to embed Enhanced Milieu Teaching into daily routines
Kashinath, Woods, & Goldstein (2006)	Implementation fidelity (IOA = N/R)		Across routines	a, b, c ^{a,b} , d, e, f, g, h, i ^a , i ^b , j, k, l	Across routines	Improved ability to embed naturalistic strategies into daily routines
Meadan et al. (2016)	Implementation (IOA= 100%) and Intervention fidelity (IOA = N/R)	Three data points post intervention	Throughout intervention	b, c ^{a,b} , d, e, f, g, h	N/R	High rates of naturalistic strategies
Peterson, Carta, & Greenwood (2005)	Intervention fidelity (IOA = N/R)	3 and 6 months post intervention		e, f, g	N/R	Use of Milieu Teaching strategies with fidelity
Vismara, Young, & Rogers (2012)	Implementation (IOA = N/R) and Intervention fidelity (IOA = 97%)	Three sessions 2 weeks apart		a, b, c ^a , d, e, f, g, h, j ^a , j ^b , l	Across routines	Use of responsive strategies with fidelity
Ware, McNeil, Masse, & Stevens (2008)	Implementation (IOA=N/R) and Intervention fidelity (kappa \geq 0.6)	1 month post		b, c ^a , d, e, f, g, l	N/R	Increased caregiver use of positive behaviors
Woods, Kashinath, & Goldstein (2004)			Caregiving and outdoor play	a, b, c ^{a,b} , d, e, f, g, h, i, j ^a , i ^b , l	Indoor Play	Improved ability to embed naturalistic

Landry, Smith, Swank, & Guttentag (2008); Landry et al. (2012)	Implementation and Intervention fidelity (IOA=N/R)		a, b, e, g, h, j ^a ,	Across routines	strategies into daily routines Improved ability to embed responsive strategies into daily routines and book-reading skills
Solomon, Van Egeren, Mahoney, Huber, & Zimmerman (2014)	Implementation fidelity (IOA = 100)		e, f, g, l,	Play	High rates of responsive strategies
Welterlin, Turner-Brown, Harris, Mesibov, & Delmolino (2012)	Implementation fidelity (IOA = 84.9-99%)	One data point	e, f, g, l	Play	Improved ability to structure the environment to teach pre-academic, communication, and self-care skills.

Note: (a) routine-based, (b) collaborative session planning, (c^a) collaborative decision making about child targets, (c^b) collaborative decision making about context of the intervention, (d) observation, (e) opportunities for practice, (f) performance-based feedback, (g) modeling, (h) reflection and problem solving, (i) progress monitoring, (j^a) identified strategies caregiver can use between sessions; (j^b) identify additional routines/ setting in which strategies will be implemented, (j^c) identify with whom else can the child practice his/her learning targets, (k) supporting caregiver independence during the session; (l) manual; N/R = not reported

Caregiver skills maintenance and generalization. The maintenance and generalization of caregiver use of intervention strategies is essential to ensure the sustainability of interventions. These features allow researchers to determine whether caregivers are able to continue to use newly acquired skills between sessions and apply them in new contexts and settings. Only half of the studies included in this literature review measured caregiver skills maintenance. The maintenance sessions occurred between 1 and 6 months postintervention (Brown & Woods, 2015; Peterson et al, 2005; Vismara, Young, & Rogers, 2012) or immediately after the intervention was completed (Ware, McNeil, Masse, & Stevens, 2008; Welterlin, Turner-Brown, Harris, Mesibov, & Delmolino, 2014). The number of maintenance data points ranged from one to three. Three of the 10 studies measured caregivers' generalized use of intervention strategies and only two study reports provided detailed information about the activities and materials selected for the generalization sessions (Kashinath et al., 2006; Woods et al., 2004). Meadan and colleagues (2016) measured generalization as well, but the authors did not provide information about the routines and activities that served as contexts for generalization.

A unique contribution to the research literature was a study by Kashinath et al. (2006) who focused on how providers can promote caregiver skill generalization. The researchers incorporated general case programming strategies (i.e., embedding intervention in a variety of contexts) into routine-based intervention to support caregivers' generalized use of teaching strategies. In addition, caregivers' independent use of each teaching strategy within each routine was an important feature of the intervention. Findings showed that proactively programming for generalization resulted in increases in caregiver use of intervention strategies across a range of activities and in positive child communication outcomes. These findings suggest that supporting caregiver independence during intervention sessions may be critical for building their capacity to

promote children's learning in the absence of EI providers. This study represents a singular example of focused attention on caregiver independence in an EI setting.

Coaching practices. As seen in Table 3, researchers in the 10 studies used the following practices to instruct caregivers: (a) focus on routines, (b) collaborative session planning, (c) collaborative decision making, (d) observation, (e) opportunities for practice, (f) performance-based feedback, (g) live or video modeling, (h) reflection and problem solving, (i) progress monitoring, (j) practices that support maintenance and generalization, (k) promoting caregiver independence throughout the sessions, and (l) manuals. Table 3 includes a description of coaching strategies.

A positive finding across these studies was that all researchers provided caregivers with opportunities to practice intervention strategies with their children while the coaches offered performance feedback. These practices align with the principles of adult learning which show that the learner's active involvement in all aspects of the learning process promotes knowledge and skill acquisition (Dunst & Trivette, 2009b). Additional research on triadic interactions has demonstrated the positive impact of coaching strategies such as feedback, guided practice, and observation that encourage caregivers' active participation in EI sessions (Brown & Woods, 2015). These coaching practices have been empirically associated with increases in caregiver use of intervention strategies. In addition, more than half of the interventions in these studies emphasized collaborative planning for sessions, support for caregivers to reflect on the success of the activities or home visits, and the use of written instructions to support intervention implementation (Brown & Woods, 2015; Kashinath et al., 2006; Meadan et al., 2016; Vismara et al., 2012; Ware et al., 2008; Woods et al., 2004). Few studies involved caregivers in making decisions to identify children's learning targets and the activities or routines that would serve as

intervention contexts (Brown & Woods, 2015; Kashinath et al., 2006; Meadan et al., 2016; Woods et al., 2004). Half of the studies embedded in their interventions those practices that aim at supporting caregiver skill maintenance (e.g., identifying collaboratively the strategies caregivers can use between sessions) and three of them integrated practices that support caregivers to apply their skills in new contexts and/or settings (Kashinath et al., 2006; Meadan et al., 2016; Woods et al., 2004). None of the studies promoted generalization across additional caregivers (e.g., teaching other family members and caregivers how to support children's learning). Only two of the 10 investigations (Kashinath et al., 2006; Peterson et al., 2005) intentionally and systematically supported caregiver initiations throughout the intervention sessions. To build self-sufficient and competent caregivers, providers should intentionally and systematically incorporate adult learning practices that allow caregivers to function independently at higher levels of performance and foster their ability to apply their knowledge and skills in a variety of contexts.

Table 3

Caregiver Coaching Practices

Caregiver coaching practices	Description	Number of studies that reported using the practice
(a) routine-based	Teach caregivers to embed the intervention strategies into at least two routines and activities.	5
(b) collaborative session planning	Caregivers and providers discuss families' priorities and plan for the home visits.	7
(c) collaborative decision making	Caregivers and providers jointly identify (a) child learning targets and (b) activities and routines for embedding intervention	$c^a=4, c^b=3$
(d) observation	Providers observe caregiver-child interactions before initiating coaching.	6
(e) opportunities for practice	Providers share information about intervention strategies, child development, or activities; providers demonstrate how to teach and describe the teaching strategies being used; providers are engaged with the dyads and provide specific suggestions; providers observe the caregivers implementing intervention strategies.	10
(f) performance-based feedback	Providers offer specific feedback regarding intervention strategy use.	9
(g) modeling (live or video)	Providers demonstrate the teaching strategies without explaining.	9
(h) reflection and problem solving (with or without video)	Providers support caregivers' reflection on the success of activities or home visits; collaboratively discuss potential adjustments.	6
(i) progress monitoring	Providers and caregivers create plans for monitoring children's progress and caregivers' intervention implementation.	3
(j) built-in practices that support caregiver maintenance and skill generalization	Providers and caregivers create action plans including (a) strategies caregivers can use between sessions, (b) additional routines/settings in which strategies will be implemented, and (c) others with whom children can practice their learning targets.	$j^a=5, j^b=3, j^c=0$
(k) supporting caregiver independence during EI sessions	Providers intentionally step back to allow caregivers to take the lead in sessions.	2

(l) manuals	Providers give caregivers written directions to support the implementation of intervention strategies.	7
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Context of caregiver coaching. Half of the reviewed studies taught caregivers to embed intervention strategies in the context of their daily activities and routines. Moreover, these researchers used both play and caregiving routines as contexts for their interventions (Brown & Woods, 2015; Kashinath et al., 2006; Landry et al., 2008; Vismara et al., 2012; Woods et al., 2004). Solomon et al. (2014) and Welterlin et al. (2012) used structured play as a context for their interventions, and these activities were suggested by the researchers. To be applicable to families and to align with policy requirements related to natural environments, interventions in natural environments should support caregivers in promoting their children's learning in the context of their preferred activities and routines. Moreover, coaching caregivers to embed intervention strategies in a variety of routines is critical in promoting their skill generalization. Research shows that caregivers who were coached to use intervention strategies exclusively in the context of play activities have demonstrated a limited ability to implement those strategies in new contexts (Woods et al., 2004). In contrast, caregivers who were coached to implement intervention strategies in different types of routines were able to support their children's learning across a variety of settings and activities (Barton & Fettig, 2013; Brown & Woods, 2015; Kashinath et al., 2006). By embedding effective intervention strategies within multiple daily routines, caregivers can provide an intensive part of interventions for their children, maximizing in this way the children's acquisition and generalization of critical functional skills.

Caregiver outcomes. The findings across all 10 studies revealed that caregiver-implemented interventions were effective in supporting caregivers to learn a variety of behaviors that advance child learning. Most of the studies reported outcomes related to caregivers' ability to accurately use teaching and responsive strategies (Brown & Woods, 2015; Kashinath et al., 2006; Landry et al., 2008; Meadan et al., 2016; Peterson et al., 2005; Solomon et al., 2014; Woods et al., 2004). In addition, caregivers learned to structure their environments to teach their children pre-academic, communication, and self-care skills (Welterlin et al., 2012), and to use behavior management strategies (Ware et al., 2008). Caregiver use of these strategies resulted in positive child outcomes.

Finally, a few studies reported positive caregiver outcomes, such as perceived increases in child communication skills, positive parent-child interactions, caregivers' ability to support child learning (Brown & Woods, 2015; Kashinath et al., 2006; Meadan et al., 2016), and decreased parental stress (Solomon et al., 2014; Ware et al., 2008; Welterlin et al., 2012). These investigations integrated family-centered principles in their interventions and included practices such as involving caregivers in decision making in identifying their children's learning targets and the activities that served as contexts for intervention, and intentionally supported the development of caregiver competencies. Investigation findings show that targeted personal caregiver outcomes align with family-centered research and that when family-centered principles are integrated in home visits caregivers feel more empowered and competent in promoting their children's learning (Dunst, Trivette, & Hamby, 2007b; Dunst et al., 2008; Dunst, Trivette, Hamby, 2006).

Conclusion

In summary, the studies reviewed in this section acknowledge the critical role of caregivers in promoting optimal development for their children and provide strong empirical support for building caregiver capacity via EI sessions. Analytic work to date is limited by the fact that few of these studies were consistent with policy requirements (IDEA, 2004) and recommended practices guidelines (DEC, 2015) for providing EI services in natural environments in ways that intentionally build the capacity of caregivers to support their children's learning. Specifically, caregivers have rarely been coached to embed intervention strategies into families' preferred routines and activities to maximize intervention opportunities. A common characteristic of caregiver-implemented interventions for infants and toddlers is the lack of rigorous investigation into caregiver skill maintenance and generalization. Moreover, very few studies proactively incorporated strategies aimed at fostering caregivers' ability to sustain intervention strategies in the absence of EI providers or apply their skills in new contexts. Furthermore, none of these studies measured caregivers' unprompted use of development-promoting behaviors as a dependent variable, nor did they focus on examining the correspondence between caregivers' initiations of development-promoting behaviors and coaching strategies.

In addition, none of these studies evaluated the effectiveness of coaching in promoting additional caregiver outcomes such as encouragement and affection; these behaviors have also been empirically associated with positive child outcomes. Finally, several caregiver-implemented interventions focused narrowly on children with autism and did not include infants/toddlers with other developmental delays or disabilities more typical of those children served in Part C programs nationally (Hebbeler et al., 2007). These findings point to the need for additional research that focuses on (a) teaching caregivers from diverse population groups to

independently embed development-promoting behaviors into their daily routines, and (b) deepening our understanding of the variables associated with caregiver independence.

III. METHOD

Participants

A purposive sampling strategy was used to enroll participants in this study. Four caregiver-child dyads were recruited through a university-based Early Intervention (EI) agency and consented to participate in the study. One family dropped out after the data collection process started due to the child's illness and another family was recruited 4 months later to replace one dyad lost to attrition. Inclusion criteria for the caregiver-child dyads were as follows: (a) the child had a chronological age of 6 to 30 months at the start of the study; (b) the child received at least weekly EI services; (c) the child had been independently evaluated as showing a developmental delay (e.g., Down syndrome) of at least two standard deviations below the mean in one or more areas of development or based on an established condition which confers automatic eligibility for services by the state EI program; (d) the child received home-based EI services; (e) caregivers consented to their children's participation; and (f) caregivers agreed with all study requirements (i.e., to learn the EPIC approach, complete all required measures, allow videotaping, and accommodate the frequency of home visits by study personnel as needed). None of the families had previously participated in coaching-based interventions, nor had they learned naturalistic intervention strategies.

Caregiver participants. The primary caregivers participating in this study were all biological mothers. A father and a grandmother participated in a portion of the sessions along with the mothers. Only data for the mothers' performance are reported in this study. Demographic information about the caregivers is included in Table 4.

Child participants. All children exhibited a significant delay or disability in at least two areas as determined by an eligibility evaluation conducted by professionals in the Part C system. Each child's Individualized Family Service Plan (IFSP) indicated the presence of both communication and motor delays. Because EPIC's target population was infants/toddlers with moderate-severe disabilities, the ABILITIES Index (Simeonsson & Bailey, 1991) was used by the project as a confirmatory index of each child's functioning level and eligibility for this SCD study. Table 4 provides information about each child's diagnosis and demographic characteristics. Child 1 and Child 4 had Down syndrome and presented with limited mobility, low muscle tone, and low communication rates. Child 2 presented with limited reciprocal interactions and self-regulation challenges, and was diagnosed with Autism Spectrum Disorder (ASD) after the onset of the study. Child 3 had multiple developmental delays and presented with limited mobility and a significant expressive language delay.

Early intervention provider. One certified early childhood special education teacher participated in this study. She held a graduate degree and had 4 years of experience working with children and families. Prior to beginning the intervention, she participated in a multi-component online training program followed by a face-to-face training session, completed two quizzes about the coaching process, and scored EI providers' use of coaching strategies during two home visits to verify she could identify coaching practices.

Table 4

Family and Child Characteristics

	Dyad 1	Dyad 2	Dyad 3	Dyad 4 ¹
Child				
Age in months	12	30	24	22
Gender	Male	Male	Male	Male
Race/ethnicity	Biracial	Biracial	Hispanic	Hispanic
Home language(s)	English	English	Spanish & English	Spanish & English
Diagnosis	DS	ASD	DD	DS
Caregiver				
Age in Years	44	29	21	40
Gender	Female	Female	Female	Female
Education Level	Graduate degree	College degree	High school	High school
Work Status	Full time	Stay-at-home	Stay-at-home	Full time
Race/ethnicity	White	Biracial	Hispanic	Hispanic
Family Income	> \$100,000	\$20,000-\$30,000	\$20,000-\$30,000	Declined
IGDI-ECI				
Weighted Total Communication rate/min	4.00 (3.30)	15.60 (16.00)	4.66 (11.80)	4.00 (10.00)
IGDI-EMI				
Total Raw Score rate/minute	0.83 (4.00)	7 (13.00)	5.83 (10.50)	8.66 (9.00)

¹ Dyad started baseline later because they replaced a family that dropped out due to the child's illness; DS= Down syndrome; ASD= Autism Spectrum Disorder; DD= developmental delay; IGDI =Infant Growth and Development Indicator; ECI =early communication indicator; EMI= early movement indicator; mean normed rates are displayed in parentheses.

Settings and Materials

All study sessions were conducted in the families' homes. An interview protocol developed by the EPIC research team was used to identify the families' priorities and preferred activities as a first step in the development of an individualized intervention plan. The EI provider and the caregiver jointly identified two routines (one play and one caregiving) that served as contexts for the intervention. Play and caregiving activities were selected because research indicates that these are recurring and familiar events in families with infants/toddlers (McWilliam, 2010; Noonan & McCormick, 2006). Because of this familiarity, these routines are considered authentic and practical in EI as a context for teaching and embedded intervention. In addition, play and caregiving routines offer naturally occurring learning opportunities for addressing both motor and communication learning targets (LTs).

Families' own toys and materials were used throughout the study. A variety of age-appropriate toys were available in each house such as push or pull toys, eye-hand coordination toys, cause-effect toys, role-playing toys, and toys that promote problem solving and early literacy skills. The child's play environment was safe and conducive to learning in all but one household. This latter household was crowded and the child had access to sharp and unsanitary objects (e.g., scissors and dirty shoes). Consequently, the caregiver had to constantly redirect the child, thus limiting his ability to explore and learn.

Experimental Design

This study involved re-coding video recordings gathered by the EPIC project for their Year 2 single case design (SCD) study. The purpose of the current study was to determine whether the SOOPR coaching approach (Independent Variable [IV]) leads to an increase in caregiver initiations of five development-promoting behaviors (Dependent Variable [DV]):

teaching, responsiveness, encouragement, affection, and gathering and sharing information. A multiple baseline study with replication across four caregiver-child dyads was used to determine whether provider coaching influenced caregivers' initiations of behaviors that promote child development (i.e., teaching, responsiveness, encouragement, and affection) in EI home-visit sessions. The internal validity of the study was strengthened by the randomized assignment of participants to the baseline condition, a minimum of three data points collected in the baseline phase, and phase replication, in addition to participants serving as their own control (Gast & Ledford, 2009). The replication across participants extends the generality of findings.

Concurrent baseline sessions were conducted for three of the dyads and a fourth non-concurrent dyad was also included. The first three dyads started the baseline phase at the same time and the fourth dyad joined the study 4 months later. By the time the fourth family started the baseline condition, the third dyad was receiving the intervention while the other two dyads were in the maintenance phase. The two design phases, baseline and intervention, were introduced in staggered fashion across participants. Correct learning trials (CLTs) were used as the primary dependent variable in the EPIC project. A CLT is an instructional approach used to systematically and intentionally embed learning trials into children's daily routines and consists of sequences of logical antecedents, consequences and error corrections (Snyder et al., 2013; VanDerHeyden, Snyder, Smith, Sevin, & Longwell, 2005). Once the first dyad demonstrated a stable rate of CLTs for a minimum of three consecutive baseline sessions, coaching was introduced, while the researchers continued to monitor the rate of CLTs for the other dyads. When the first dyad showed an accelerating CLT trend, the second dyad completed three consecutive baseline sessions within a week and then began the intervention. The third and fourth dyad followed the same procedures.

Measures

EPIC project assessments. The following assessment tools were administered as part of the EPIC project to gain an understanding of the children's initial and final performance levels: *Assessment, Evaluation, and Programming System* (AEPS; Bricker, 1994); the *Individual Growth and Development Indicators for Infants and Toddlers* (IGDI)–Early Communication Indicator (ECI; Luze et al., 2001), the *IGDI*–Early Movement Indicator (EMI; Greenwood, Luze, Cline, Kuntz, & Leitschuh, 2002), and the *ABILITIES* Index (Simeonsson, Bailey, Smith, & Buysse, 1995). The AEPS was used to gain information about children's developmental strengths and needs, and identify their motor and communication targets for the intervention. The IGDI-ECI and IGDI-EMI were administered as pretest and posttest measures to assess the children's communication and motor skills before and after the intervention. The *ABILITIES* Index was used to profile functional skills and limitations of participating children and functioned as a confirmatory index of the children's eligibility for the EPIC study. All instruments had adequate psychometric properties. IGDI-ECI and IGDI-EMI scores before the intervention are displayed in Table 4.

PICCOLO. *PICCOLO* is a strengths-based instrument that measures parenting skills that predict a child's cognitive, communication, and socio-emotional outcomes (Roggman et al., 2013). The instrument includes 29 items grouped in four domains: affection, responsiveness, encouragement, and teaching. *Affection* involves warm physical and verbal expression of emotions, such as praise. For example, while interacting with the child, the caregiver uses positive expressions about the child's actions or characteristics (e.g., "all right"). *Responsiveness* is defined as responding to the child's cues, emotions, interests, and behaviors. An example is following the child's lead by getting involved in the child's activities. *Encouragement* refers to

supporting the child's exploration, initiative, curiosity, and play. For example, the caregiver supports the child in doing things independently (e.g., the parent lets the child try before offering help or suggestions). Although *PICCOLO* includes a *teaching* sub-scale, it was not used to measure caregivers' initiations of teaching because it does not align with the EPIC approach. Some teaching behaviors included in *PICCOLO* were not part of the EPIC intervention (e.g., explaining to the child how and why things happen or engaging in pretend play), and some teaching strategies included in the EPIC intervention were not part of *PICCOLO* (e.g., environmental arrangement). The operational definitions developed by EPIC (see Table 5) were used to code mothers' teaching behaviors to avoid unstable baseline observations and potential lack of a functional relation between independent and dependent variables.

PICCOLO is intended to be a culturally sensitive observational instrument that measures developmental parenting skills of caregivers whose children are between 10 and 47 months of age. The sample used to develop *PICCOLO* included 2,048 low-income European American, African American, and Latino American families. Of these families, 10% had children receiving EI services under Part C or diagnosed with developmental delays that would qualify them for these services (Innocenti et al., 2013). *PICCOLO* has adequate psychometric properties: interrater reliability averaged .77 across domain scores and absolute item agreement averaged 75% across domains. Internal consistency alpha across the four domains averaged .78. *PICCOLO* scores at ages 1, 2, and 3 years significantly predicted children's cognitive-language development at age 3 ($r=.21-.27$) and at age 5 ($r=.24-.27$), and overall development at age 3 ($r=.19-.24$) and at age 5 ($r=.23-.25$).

Observational Coding Systems

For this study, video recordings of home-visit sessions gathered by the EPIC project were coded in their entirety for each dependent variable. The investigator and one graduate student served as primary coders. Two other graduate students were involved in establishing reliability. Each coder was trained on one of the three coding systems described below through a rigorous training process that consisted of reading the definitions, examples, and non-examples of the operationally defined behaviors, and watching an exemplar for each definition. The coders then coded alongside the investigator and discussed their rationale for the chosen codes. Based on these conversations, additional information and examples were added to the coding manual to enhance the clarity and objectivity of the definitions. After meeting a minimum criterion level of .60 as measured by Cohen's Kappa, the coders began coding the study sessions. To prevent drift from the coding systems, weekly or biweekly meetings were held to discuss the definitions and coding disagreements.

Caregiver initiations of teaching strategies. The frequency of mothers' initiations of teaching behaviors was determined by direct observation using a timed event-recording procedure. Teaching strategies were identified in the videos and the time of their occurrence was recorded. As displayed in Table 5, the strategies were grouped into categories of environmental arrangement (e.g., intentional arrangement of materials in sight but out of reach), contingent responding (e.g., balanced turn-taking, contingent imitation, expansions, and modeling), wait time and prompting (e.g., least-to-most and most-to-least prompting). The teaching strategies were used to support the children's acquisition of targeted communication and motor skills. The categorization of strategies for analysis was consistent with the type of intervention strategies

taught to the caregivers. The definitions of teaching behaviors were designed to capture the discrete teaching behaviors addressed by the first research question.

Table 5

Teaching Strategies Initiated by Caregiver

Naturalistic Strategy	Examples of Communication Target	Examples of Motor Target
Environmental Arrangement		
Positioning	Caregiver moves to position herself in a way that facilitates communication and joint interaction. Example: Mom and child are face to face at child's eye level and engage in verbal interaction. Nonexample: Mom and child are facing each other, but mom is not at child's eye level (child sits, mom stands in front of him).	Caregiver moves to position herself in a way that facilitates child's movement. Example: Mom situates child in the prone position and then she lies on the floor in front of child to encourage him to lift his head up and push his chest off the ground.
Arranging the materials	Example: Caregiver places interesting toys in play area to encourage child to vocalize. Nonexample: Child is not interested in the toy presented by the mom; however, mom encourages child to play.	Caregiver places an attractive toy on the couch to encourage child to pull up to stand.
In sight but out of reach	Caregiver places child's preferred toy or food item in his field of vision but out of reach and waits 3-6 sec to give him time to request the toy. Example: Mom holds up a bottle of milk in front of child and waits 3 sec. Child vocalizes and reaches for the bottle. Mom hands him the bottle. Nonexample: Mom places the food within reach and child has immediate access to the food.	Caregiver places an interesting toy out of reach to encourage child to crawl.
Contingent Responding (notice, respond, model, expand)		
Balanced turn-taking	Caregiver takes one verbal or nonverbal turn and waits for child to take a turn. Example: Caregiver asks a question, child responds, caregiver responds back, etc.;	Caregiver takes one motor turn and waits for child's motor act. Example: Mom and child roll a toy car back and forth.

Contingent imitation	<p>Nonexample: Mom asks a question and then another one without waiting for child to respond.</p> <p>Caregiver imitates child's play action or communication act.</p> <p>Example: Child says, "baba" and then mom says, "baba."</p>	<p>Caregiver imitates child's motor act.</p> <p>Example: Child bangs two blocks, and then mom bangs two blocks.</p>
Expansions	<p>Nonexample: Child says "baba" and mom asks, "Do you want the bottle?"</p> <p>Caregiver responds to child's verbal or non-verbal communication by adding a word based on child's utterance.</p> <p>Example: Child says "ball," mom replies, "blue ball."</p> <p>Nonexample: Child says "ball," mom asks, "Do you want the ball?"</p>	<p>Caregiver expands child's motor act.</p> <p>Example: The child shakes the block, then mom, after shaking it, stacks the block.</p>
Modeling	<p>Caregiver provides a model of child's communication target.</p> <p>Example: Child looks toward his bottle of milk which is out of reach and mom reaches and says, "milk" before getting it.</p> <p>Nonexample: Child looks toward his bottle of milk and mom says, "Do you want your milk?"</p>	<p>Caregiver provides a model of the desired motor goal.</p>
Wait Time	<p>Caregiver stops and looks at child, waiting for an answer, while providing through gestures the cue for the child to perform the desired utterance or gesture, and waits 3-5 sec for child to perform the skill.</p> <p>Example: Mom gives child a cracker, waits 3 sec after child finishes the cracker and looks expectantly for child to gesture "more."</p> <p>Nonexample: Mom gives child another cracker after 2 sec.</p>	<p>Caregiver stops and looks at child, waiting for an answer, while providing a nonverbal cue for child to perform the motor target, and waits 3-5 sec for child to perform the skill.</p> <p>Example: Mom holds toy in front of child and waits for child to bring hands to midline to hold it.</p>
Prompting		

Least to Most Prompting Sequence	<p>Caregiver begins with the least restrictive/supportive prompt and increases support as needed.</p> <p>Adult gives the least supportive prompt and waits for child. If child responds with a target, adult responds contingently. If child does not respond, adult gives increased support.</p> <p>Example: Mom says, "What do you want?" Child looks at mom. Mom says and models the gesture "milk" (target). Child uses "milk" gesture and mom gives him milk.</p> <p>Nonexample: Mom hands child the bottle of milk without modeling the gesture.</p>	<p>Example: Mom places one finger under each arm to help child stand. If child is not able to stand, mom places both hands under his arms.</p>
Most to Least Prompting Sequence	<p>Caregiver uses a direct prompt to request child to produce a communication target (e.g., one-word utterances), then waits 3-5 sec for child to respond. If child responds with a target, adult responds contingently. If child does not respond, adult repeats the prompt.</p> <p>Example: Mom says, "Say <i>cookie</i>" and waits 3 sec before repeating the prompt.</p> <p>Nonexample: Mom says, "Say <i>cookie</i>; come on, if you want the cookie you have to say <i>cookie</i>." Mom does not wait 3-5 sec for child to respond and uses a sentence instead of a single word to prompt child.</p>	<p>Caregiver begins by giving full physical support. As child becomes more independent in performing the skill, the amount of support is reduced.</p> <p>Example: Mom provides hand-over-hand assistance to support child to place a ball in the box. As child becomes more proficient, she decreases support (e.g., nudges his arm toward box.)</p>

Adapted from Embedded Practices and Intervention with Caregivers.

Caregiver initiations of responsiveness, encouragement, and affection. The *PICCOLO* was used to code caregivers' initiations of responsiveness, encouragement and affection across all design phases. A 3-min, whole interval recording system was used to code these behaviors. The baseline, maintenance, and generalization video sessions consisted solely of caregiver-child interaction in which no provider coaching occurred. The intervals were divided into 3-min segments and coded using the guidelines included in Appendix A. Because the provider was present during the intervention phase, the 3-min segments of caregiver-child interaction where the provider was not engaged were identified using the coding rules and procedures described in Appendix B. Each item of the *PICCOLO* was scored on a scale of 0 to 2, where "0" indicates the absence of the behavior, "1" indicates that the behavior is brief and emerging, and "2" indicates that the behavior is clearly and frequently observed. These data were used to calculate percentages of scores of two caregiver initiations for each sub-scale and were used to answer the first research question that seeks to determine the extent to which coaching influenced caregivers' independent demonstration of responsiveness, encouragement, and affection.

Caregiver initiations of behaviors to gather and share information. Caregivers' ability to garner or share information and resources related to child development, LTs, strategy use, and the context for teaching were coded using a timed event recording system (see Table 6 for operational definitions). The time of the occurrence of each behavior was noted along with its corresponding code. The frequency of these behaviors was used to determine the type of coaching strategies corresponding to caregivers' initiations related to gathering and sharing information (this study's second research question).

Table 6

Caregiver's Initiations of Gathering and Sharing Information

Code Title	Definition
Sharing Information (SI)	CG <i>initiates</i> : Sharing information about child or family (child progress, recent activities, general information, and health)
Plans for visit (PV)	CG initiates a discussion about the plan for the current session: embedding specific target(s), using teaching strategies, and identifying the routines or activities that will serve as contexts for intervention
Exchange about routine (ER)	CG initiates an exchange of ideas or information relevant to the activity/routine
Exchange about target (ET)	CG initiates an exchange of ideas or information relevant to the learning target
Exchange about strategy (ES)	CG initiates an exchange of ideas or information relevant to the intervention strategy
Progress monitoring (PM)	CG initiates a discussion about ways to evaluate child progress between current and next planned visit
Reviews plan (RP)	CG describes and modifies the plan as needed

Provider coaching strategies. To measure coaching strategies, video-recorded intervention sessions were coded in their entirety using a continuous timed event recording system. Each home-visit video was coded to measure the SOOPR coaching strategies used by the provider based on a hierarchical and mutually exclusive set of coding definitions that align with EPIC's coaching framework. Table 7 includes a description of the coaching definitions for

each practice. These definitions and coding system capture the type and frequency of coaching strategies, and were used to determine the co-variation between coaching strategies and the increase in caregivers' initiations of teaching, and gathering and sharing information behaviors (this study's second research question).

Table 7

Overview of EPIC Coaching Framework

Coaching Strategy	Definition	Examples
Setting the Stage	The provider and the caregiver work together to plan the agenda for the session, including identifying child's LTs and the routines that will serve as contexts for the intervention. In addition, the child's progress in response to intervention is discussed. Setting the stage provides the opportunity for the caregiver to actively engage in decision making, and focus on the family's priorities and activities that are meaningful for the child and family.	<ul style="list-style-type: none"> -The EI provider asks the mother if she had the opportunity to implement the teaching strategies they used in the previous session. The mother shares that she used the sign "more" and "milk" during meal times and her daughter imitated the signs a couple of times. - The EI provider asks what the mother would like to focus on in the current visit. The mother says that she feels comfortable teaching sign language during meal time, and wants to expand the implementation of sign language to the handwashing routine.
Observation	Observation is an instrument for garnering information about caregiver-child interaction, and families' routines. The EI provider uses this information to provide the most effective coaching.	The EI provider sets up the observation by explaining the caregiver what she is doing. For example, the provider can say, "I'm going to step back so I can see how you and Kelly typically interact during the book-reading routine." Then, the EI provider watches caregiver-child interaction without interfering with the dyad. The observation allows her to learn how this routine goes before coaching the caregiver on how to embed specific instructional strategies.
Opportunities to Practice	EI providers intentionally provide opportunities for caregivers to practice strategies that support child outcomes during home visits. Service providers use various coaching strategies to build caregivers' competence and confidence in supporting the growth and development of their children. These strategies include:	<ul style="list-style-type: none"> - Direct teaching: The provider explains to the caregiver that placing her arm against her child's feet while he is on his tummy, gives him the needed support to push off and begin to crawl. - Demonstration with narration: The provider screws the top of a bubbles container and hands it to

	<p>-Direct teaching which occurs when the service provider shares information about an intervention strategy or child development in order to increase the caregiver's knowledge.</p> <p>- Demonstration with narration which occurs when the service provider models a strategy with the child while simultaneously narrates her actions to increase the caregiver's understanding about the strategy use.</p> <p>-The caregiver observes. As the service provider demonstrates, she narrates her actions.</p> <p>- Guided Practice with feedback occurs when the service provider and the caregiver work together with the child and exchange roles in practicing an intervention strategy.</p> <p>- Caregiver practice with feedback occurs when the service provider steps back and allows the caregiver to take the lead in practicing an instructional strategy. The EI provider's role is to observe and provide feedback without interrupting the routine.</p>	<p>the child. She tells the caregiver that she is using this strategy to prompt the child to vocalize or use gestures to ask the adult to blow more bubbles.</p> <p>- Guided Practice with feedback: The provider hands the caregiver a toy and suggests that if the caregiver holds it up in front of the child, the child will reach for it.</p> <p>- Caregiver practice with feedback: The caregiver offers her daughter a choice between two food items and waits for her to respond. The provider observes without commenting. After the child selects the preferred food item, the provider comments to the caregiver that pausing for a few seconds gave the child time to look at the food items and reach for the preferred one.</p>
Problem Solving and Reflection	<p>As the session progresses, the EI provider or the caregiver initiates an exchange of ideas related to child LTs, what worked and/or did not work, and what needs to be adjusted. The caregiver and provider generate ideas to improve the use of strategies and expand the learning opportunities to new contexts/activities.</p>	<p>After the caregiver and the child completed a play episode/routine, the provider asked the caregiver how she thought it went. She responded that giving her daughter choices between toys increased her interest in play. The provider and the caregiver talk about incorporating choices in different routines to increase the child's choice making and her ability to communicate.</p>
Review	<p>The provider and the caregiver review the strategies used during the session and summarize what worked and whether adjustments are needed. They identify the strategies the caregiver can use between home visits.</p>	<p>At the end of the session, the provider asked the caregiver how she thought it went and what strategies she feels comfortable incorporating between the current and the next visit. The mother said that she felt the session went well and she would use the system of least-to-most prompts to help her son to stand independently.</p>

Experimental Procedures

All sessions in the EPIC study occurred in families' homes at times convenient for the families. These sessions were video recorded in their entirety as part of the EPIC project and with the exception of maintenance and generalization sessions were video recorded by a videographer who accompanied the provider. Based on the family's preference, maintenance and generalization sessions were recorded by either the videographer or a family member. Each phase of the SCD study is described below.

Pre-baseline phase. Two home visits were conducted prior to initiation of the baseline condition. In the first home visit, the EI provider met with each recruited family, explained the EPIC project, obtained informed consent, and gathered initial child assessment data to confirm the child's eligibility for the study (the ABILITIES Index; Simeonsson et al., 1995) and assess the child's global developmental levels (AEPS; Bricker, 1994). After completing these assessments, the EI provider conducted a semi-structured family routines interview using a protocol developed by the EPIC team. Two routines from two different routine categories (i.e., play and caregiving), and two learning targets (LTs) (i.e., motor and communication skills) were collaboratively identified with the caregivers. During the second pre-baseline home visit, the provider administered the *IGDI* motor and communication measures (Greenwood et al., 2002; Luze et al., 2001) to evaluate the child's skills in these two domains. Subsequently, the provider and the caregiver used the assessment information to jointly set intervention goals for the child. At the end of the second visit, each family was provided with handouts and verbal descriptions of the baseline observation process.

Baseline phase. The baseline condition consisted of video recording 10- to 20-min samples of caregiver-child interaction during the identified routines (i.e., play and caregiving).

The caregivers were asked to interact with their children as they normally would. No coaching was provided in this phase. The number of baseline sessions varied from three to 13 across dyads. This resulted in a total of 27 concurrent and five non-concurrent baseline sessions.

Pre-intervention session. A single pre-intervention session occurred after the last baseline session and before the first intervention session. During this session, the EI provider introduced the EPIC approach in detail to each caregiver and provided handouts describing the EPIC components. In addition, the caregiver and the provider watched several video clips from the baseline home visits. After watching the video examples of parent-child interaction, the provider asked, “What did you see yourself doing in this video to support your child’s learning in this routine?” The purpose of this probe was to elicit the caregiver’s pre-existing knowledge about the specific strategies she used to support her child’s learning in the targeted routine.

Intervention phase. The EPIC intervention was introduced at different points in time in staggered fashion. The EI provider followed a coaching protocol consisting of: (a) a review of the child’s LTs and the plan for the home-visit session (Setting the Stage, SS), (b) planned observation (Observation, OBS), (c) supporting the caregiver’s use of embedded naturalistic teaching strategies within identified routines (Opportunities to Practice, OPP), (d) problem solving and reflection/discussion about strategy use (Problem Solving and Reflection, PS), and (e) planning for what the caregiver could do between visits when the provider was not there (Review, R). Each session began with a discussion about the child’s progress and the mother’s priorities for the session. The provider introduced one naturalistic teaching strategy that best matched the LT for the child and demonstrated it for the caregiver. The caregiver then practiced the strategy within the two routines with feedback from the provider. Four naturalistic teaching strategies were progressively introduced to the caregiver throughout the SCD study (i.e.,

environmental arrangement, contingent responding, wait time, and prompting). An overview of these naturalistic strategies is provided in the Measures section and Appendix C. The coaching strategies aimed to increase caregivers' participation and independent use of naturalistic teaching strategies. Plans for between home-visit sessions were developed collaboratively with the caregivers at the end of each intervention session.

The naturalistic teaching strategies were introduced gradually and individualized for each family based on data collected in the baseline condition. Strategy selection was based on three factors: (a) the strategy was absent from the parent's repertoire, (b) the strategy was appropriate for influencing the child's LT, and (c) the strategy was easy to implement across the identified routines. Once the caregiver became familiar with one strategy, a new strategy was introduced. The EI provider intentionally provided information on why the strategy was a good fit for the child's LT and routines, as well as how/where/when and with whom the strategy could be used to increase the likelihood that the caregiver would use the strategy in the absence of the provider. Throughout the intervention, the EI provider's role was to support the caregiver to be actively involved in decision making and to use the newly learned strategies within contexts that were meaningful for the family (McWilliam, 2012; Salisbury et al., 2010; Woods, 2005).

The intervention phase employed a "front-loading" technique in which three home visits occurred in Week 1, two visits in Weeks 2 and 3, decreased to weekly visits by Week 4, and continued until a minimum of eight visits or a maximum of 12 visits were completed. Front-loading was based on preliminary dosing research by Warren et al. (2007) and addressed the need for greater understanding in EI about how treatment intensity may be related to building the caregiver's capacity to attain desired child outcomes.

Maintenance and generalization phase. Weekly follow-up sessions were carried out for 5 weeks following the last intervention session. A videographer recorded caregiver-child interactions in the two trained routines (e.g., play and mealtime) and one untrained (generalization) routine of the caregiver's choice to determine the sustainability and generalizability of the intervention (i.e., parents' use of embedded intervention teaching strategies across routines in the absence of the EI provider).

Reliability

For each coding system, at least 30% of the sessions across conditions and participants were randomly selected and independently coded by a second coder. Reliability was calculated on a point-by-point basis for all coding systems. For the time-stamped counts of behaviors, the window for agreement was 2 sec for caregiver initiations of teaching strategies, and 5 sec for provider coaching and for caregivers' initiations of gathering and sharing information. Cohen's Kappa was calculated for each dependent variable to account for the possibility of agreement occurring by chance. Reliability means surpassed the acceptable value of 0.60 for each dependent variable, condition, and participant: caregiver initiations of teaching strategies (0.79), responsiveness (0.94), encouragement (0.97), affection (0.91), and provider coaching (0.81).

Fidelity

Fidelity of the implementation of the coaching strategies was measured for all intervention sessions using a 12-item fidelity checklist (see Appendix D). Intervention fidelity was measured to determine caregivers' use of the following intervention components: (a) description of child's learning target (*what*), (b) description of why the learning target/routine/strategies are related child's participation or functional outcome (*why*); (c) description of when/where/with whom the embedded instruction will occur; (d) description and

demonstration of teaching strategies (*how*); (e) description or demonstration of measured child progress (*How do we know it's working*). A second graduate assistant coded 30% of the intervention sessions to ensure ongoing reliability of the fidelity coding.

Social Validity

Following the intervention phase, social validity data were collected by the EPIC project through the Caregiver Feedback Survey (see Appendix E) and a semi structured interview protocol.

Caregiver feedback survey. An adaptation of the Intervention Rating Profile-15 (Witt & Elliott, 1985) was used to evaluate the social validity of the EPIC approach. The caregivers provided input on the intervention's utility, acceptability, and feasibility by responding to 10 questions on a 4-point scale. The items were focused on coaching, teaching strategies, everyday activities and routines, the EPIC approach, and self-efficacy. Example scale items included: "To what extent do you think coaching was useful to support your learning of how to teach your child?"; "Outside of EPIC home visits, how often did you use the intervention strategies in the routines you identified and practiced with your EPIC provider?"; and "To what extent do you think the EPIC approach helped you to take a more active role in your child's learning?"

Interviews. The interview protocol included 14 questions focused on caregiver's perceptions of the coaching process, intervention strategies, the EPIC approach, and how the interactions with their children changed over time. These questions were used not only to explore caregivers' views on EPIC, but also to evaluate intervention's feasibility, utility and acceptability. The detailed qualitative data, as part of the larger EPIC project, was analyzed and

reported separately. For further exploration of the caregiver's and provider's views on and experiences with the EPIC approach, the reader is referred to Salisbury et al. (2017) study.

Data Analysis

Data sampling. The number of sessions varied for each caregiver-child dyad due to the multiple baseline design. Performance data of 29 baseline (*range*=3 to 13), 43 intervention (*range*=8 to 15), and 20 follow-up (five per family) sessions were collected. For the purpose of this investigation, all baseline, intervention, and follow-up sessions were coded in their entirety to measure the five dependent variables. Caregiver use of teaching strategies as well as gathering and sharing information, and provider coaching strategies were coded continuously. Responsiveness, encouragement, and affection were coded using a 3-min whole interval coding procedure. Although the *PICCOLO* authors recommended coding intervals of behavior that last between 5 and 10 min, for this study the duration of the observation was reduced to 3 min because no 5-to-10-min segments in which the caregiver interacted predominantly with the child were identified in several sessions from the intervention condition. The 3-min segments were long enough to capture all the parenting behaviors measured by the *PICCOLO*. Since the provider's interaction with the dyad could affect the caregiver-child dynamic and, consequently, lead to lower parenting scores on the *PICCOLO* subscales, only the 3-min segments in which the caregiver interacted with the child for at least 90% of the total duration of the interval were selected. Inclusionary criteria for selecting the 3-min segments during the intervention phase are included in Appendix B. All baseline, maintenance, and generalization sessions were divided into 3-min segments and rated individually per the *PICCOLO* definitions. A total of 355 3-min segments was identified across all dyads.

Caregiver initiations of teaching strategies. The frequency of the four teaching strategies (environmental arrangement, contingent responding, wait time, and prompting) was aggregated to calculate the rate per min of caregiver initiation of teaching strategies (total number of the four strategies divided by the total number of min of each session). The rates per min of aggregated teaching behaviors were graphed across all design phases to evaluate the impact of coaching on caregivers' independent use of the teaching strategies.

Caregiver initiations of responsiveness, encouragement, and affection. Percentages of scores of 2 (behaviors clearly demonstrated) were calculated following a two-step process to summarize caregiver initiations of responsiveness, encouragement, and affection across all design phases. First, the percentage of scores of 2 for each 3-min interval was calculated by dividing the sum of scores of 2 by the total number of items of each subscale, and multiplying the product by 100. Second, the average of percentages of scores of 2 for each session was calculated by dividing the sum of scores of 2 across all 3-min intervals of each session by the total number of 3-min intervals of each session, and multiplying the product by 100. The averages of percentages of scores of 2 for each session were graphed across all design phases to determine the impact of coaching on caregiver initiations of responsiveness, encouragement, and affection.

Single-case data analysis. The functional relation between coaching (IV) and the four parenting behaviors (teaching, responsiveness, encouragement, and affection; DV) was analyzed through visual inspection and descriptive statistics. Visual analysis consisted of examining: (a) level stability and changes in level between and within design phases; (b) trend direction, stability, and changes between and within design phases; and (c) percentage of non-overlapping data (PND).

Within condition analysis. Within condition analyses was conducted to determine levels and trends across all design phases. Levels within conditions were measured in terms of level stability and level change using the median values of each phase. Level stability was calculated for each behavior by superimposing the stability envelope ($0.25 \times \text{median of baseline}$) over the median level of each condition. Data were considered stable if 80% of the data points fell within 25% of the median values of each condition. Level change describes the amount of change in performance within each condition and was calculated using the median of each condition. Trend direction was estimated using the split-middle method and was described as either accelerating, decelerating, or zero-celerating (Gast & Spriggs, 2014). Trend stability was determined by superimposing the stability envelope over the slope of each condition. The same 80%-25% criterion was used to estimate the stability of the trend.

Between adjacent conditions analysis. Between conditions analysis was used to estimate what effect coaching had on caregiver initiations of the four parenting behaviors (teaching, responsiveness, encouragement, and affection) by comparing the intervention, maintenance, and generalization phase data with the baseline phase data. Between condition analysis determined changes in level (magnitude and stability), changes in trend (direction and stability), and PND.

Patterns between variables. Percentage of frequency counts of coaching behaviors and the rate per min of caregiver independent use of strategies for teaching, and gathering and sharing information were graphed together across intervention sessions for each dyad. The average percentages of scores of 2, which summarize caregiver initiations of encouragement, responsiveness, and affection during the intervention phase, were graphed along with the percentages of coaching strategies for each dyad. These data were used to identify the correspondence between specific coaching strategies and caregiver initiations of the five

development-promoting behaviors (teaching, responsiveness, encouragement, affection, and gathering and sharing information).

In addition, the rate of increase in caregiver initiations (CGII) for each dyad was calculated by subtracting the average of the rate per min of caregiver initiations of teaching strategies during the baseline sessions from the average of the rate per min of caregiver initiations of teaching strategies during the maintenance and generalization sessions and dividing the difference by the number of intervention sessions. These data were used to determine whether there was a correspondence between the frequency of caregivers' initiations during the intervention and their improved ability to use the teaching strategies after the intervention was complete. This formula was applied to each dyad. Because the number of intervention sessions differed for each caregiver due to the multiple baseline design, CGII rate was prorated (divided by the number of sessions) to take into account the time each caregiver spent in the intervention. The assumption is that the rate of a caregiver's progress is commensurate with the duration of the intervention. CGII rate for each dyad was graphed together with the aggregated percentages of caregiver initiations of teaching strategies and gathering and sharing information behaviors. Caregiver's initiations of affection, responsiveness, and encouragement were not included in this analysis because these behaviors were measured with the *PICCOLO* rating scale which did not accurately capture the frequency of the behaviors.

IV. RESULTS

The first purpose of this study was to examine the functional relation between the SOOPR caregiver coaching practices and caregivers' initiations of development-promoting behaviors – teaching, responsiveness, encouragement, and affection. The second purpose of this study was to identify which coaching strategies correspond to an increase in caregivers' independent use of teaching, responsiveness, encouragement, affection, and gathering and sharing information behaviors.

Caregiver Initiations of Teaching, Responsiveness, Encouragement, and Affection

Data on caregiver rates per min of independent use of teaching strategies are displayed in Figure 1. Percentages of scores of 2 of caregiver initiations of responsiveness, encouragement, and affection are presented in Figures 2, 3, and 4, respectively. Summaries of within and between conditions analyses for each dyad are included in Appendix F. Across the four dyads, caregivers increased their initiations of three out of four development-promoting behaviors: teaching, responsiveness, and encouragement. These results support the functional relation of the independent variable of SOOPR coaching practices to the dependent variable of caregivers' initiations of these three development-promoting behaviors.

Teaching. Caregivers' independent use of four intentional teaching strategies (i.e., environmental arrangement, contingent responding, wait time, and prompting) were measured using an event-recording procedure. Caregivers' initiations of aggregated teaching behaviors across all design phases are displayed in rate per min in Figure 1.

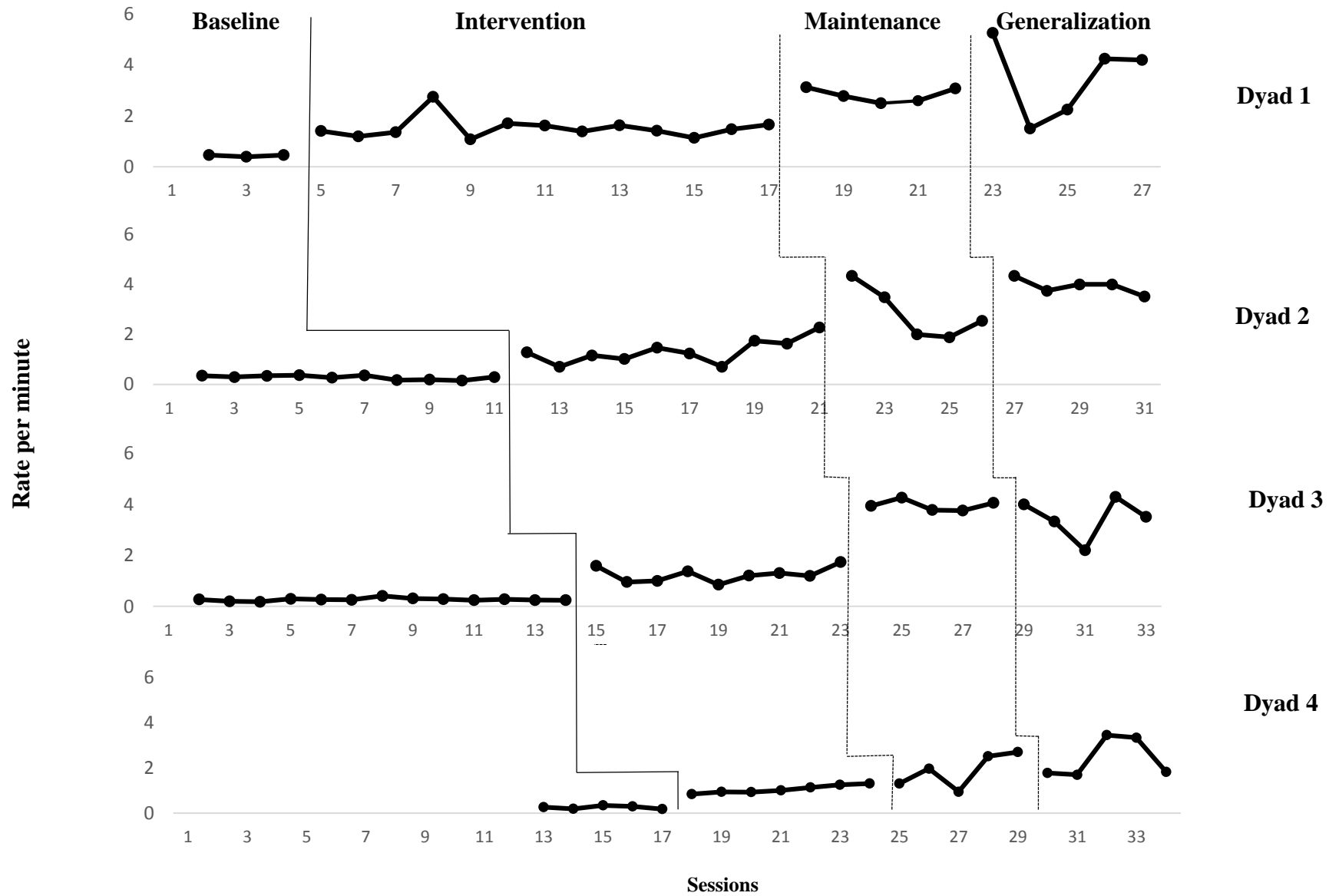


Figure 1: Caregiver initiations of aggregated teaching behaviors across all design phases.

Caregiver 1. Caregiver 1's performance data are presented in Figure 1. Her baseline performance was stable, with 100% of data points falling within the stability envelope. Caregiver 1 demonstrated no change in level and evidenced low rates of initiations of teaching strategies within the baseline condition ($mean = 0.44$, $range = 0.39-0.46$). Upon the introduction of coaching (IV), she immediately increased her rate per min of teaching behaviors ($mean = 1.52$, $range = 1.08-2.75$). Caregiver 1's performance data demonstrate a zero-celerating trend (i.e., data points are parallel to the y axis) and variability throughout the intervention phase. The initiations of teaching strategies were sustained in both the maintenance and generalization routines, and their mean and median levels surpassed the baseline and the intervention levels. Percentage of non-overlapping data (PND) = 100% between Caregiver 1's baseline data points and her intervention data points. Maintenance and generalization data points overlap with the intervention data but not overlap with the baseline data.

Caregiver 2. As seen in Figure 1, Caregiver 2 showed relatively stable baseline performance, with 70% of data points falling within the stability envelope. She initiated teaching strategies at a low rate ($mean = 0.28$, $range = 0.15-0.37$) during the baseline condition. When coaching was introduced, there was an immediate level change ($mean = 1.32$; $range = 0.7-2.28$) in her performance data. Despite variability, Caregiver 2 presented with a slightly upward slope and 100% PND, indicating increased levels of teaching strategy use from the baseline to the intervention phases. She maintained high levels of teaching strategies during the maintenance phase ($mean = 2.85$, $range = 1.89-4.33$) but the data are variable and indicate a decelerating slope. The maintenance performance data overlap with the intervention data but do not overlap with the baseline data. Caregiver 2 continued to use the teaching strategies at a high rate during the generalization routine ($mean = 3.92$, $range = 3.51-4.33$). She demonstrated 100% PND in

her performance level from the baseline to generalization phases and from intervention to generalization phases.

Caregiver 3. As shown in Figure 1, Caregiver 3 demonstrated stable baseline performance (with 85% data points within the stability envelope) and a zero-celerating trend line. Her baseline performance data reveal an average rate per min of teaching strategy use of 0.27 (*range* = 0.18-0.31). Her intervention performance data indicate a steep increase as a function of coaching (*mean* = 1.25; *range* = 0.85-1.74). Caregiver 3's intervention performance data indicate variability and a zero-celerating trend line for teaching strategy use. Despite variability and flat slope, Caregiver 3 presented with 100% PND in her level change from the baseline to the intervention phase. She demonstrated significantly increased levels of teaching strategy use during the maintenance (*mean* = 3.96, *range* = 3.76-4.27) and generalization (*mean* = 3.47; *range* = 2.2-4.3) routines. Caregiver 3's maintenance and generalization data points do not overlap with her intervention or baseline data points (PND = 100%).

Caregiver 4. As illustrated in Figure 1, Caregiver 4's baseline performance was stable, with 80% of data points falling within the stability envelope. She initiated teaching strategy use at an average rate of 0.26 per min (*range* = 0.18-0.35) and with a zero-celerating trend line. When coaching was introduced, she abruptly increased her rate per min of initiations of teaching behaviors (*mean* = 1.06; *range* = 0.85-1.31). The intervention data trend line is accelerating and stable, with 100% of data points falling within the stability envelope. There is no overlap between intervention and baseline data points (PND=100%). Caregiver 4 sustained her teaching strategies initiations throughout the maintenance and generalization routines, and her mean performance levels in these phases surpassed the baseline and intervention levels. Maintenance

and generalization data are highly variable, and the data points overlap with the intervention data but not with the baseline data.

Responsiveness. Caregivers' responsiveness toward their children was measured with the Responsiveness subscale of the *PICCOLO*. Figure 2 shows the averages of percentages of scores of 2 in 3-min samples obtained by each caregiver on the Responsiveness subscale across all design phases.

EXAMINING CAREGIVERS' INDEPENDENCE

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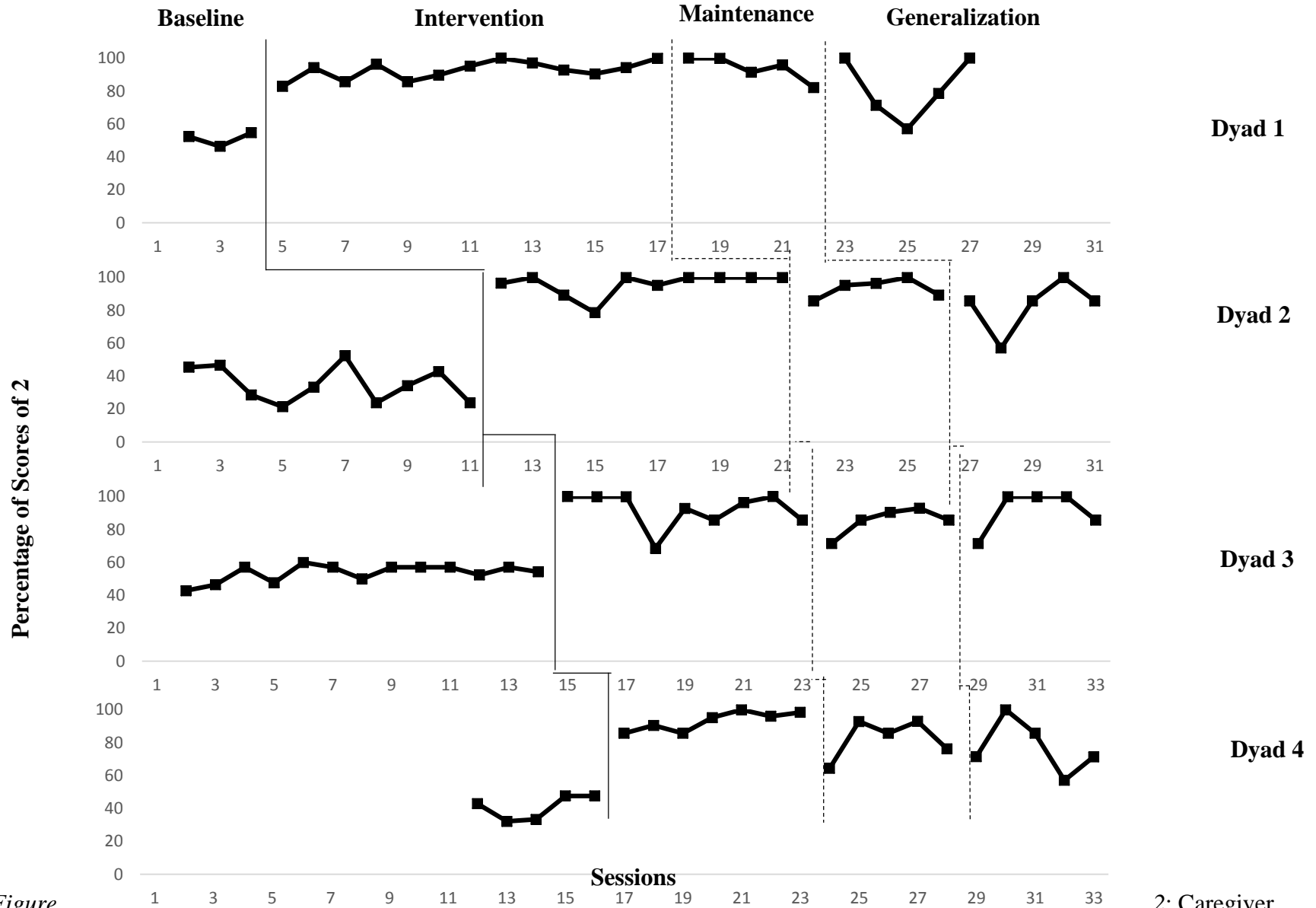


Figure initiations of responsiveness in 3-min samples across all design phases.

Caregiver 1. Caregiver 1 demonstrated stable baseline performance, with 100% of the data points falling within the stability envelope. Her baseline performance indicated an average percentage of scores of 2 of 51% (*range* = 46%-55%) and a flat slope. With the introduction of coaching, Caregiver 1 showed a steep increase in her percentage of scores of 2 for the responsive behaviors (*mean* = 93%; *range* = 83%-100%). The intervention phase trend line is zero-celerating because the percentages of scores of 2 are clustered in the upper range (83%-100%). PND was calculated at 100%, indicating Caregiver 1's increased level of responsive behaviors from the baseline to the intervention phase. These behaviors were further sustained into the maintenance (*mean* = 94%; *range* = 82%-100%) and generalization (*mean* = 81%; *range* = 57%-100%) phases. Caregiver 1 demonstrated minimal performance variability during the intervention and maintenance phases but her performance data are variable during the generalization phase. PND results show 100% nonoverlap between intervention data points and maintenance and generalization data points.

Caregiver 2. As shown in Figure 2, Caregiver 2 demonstrated variable baseline performance with a zero-celerating trend line. Her baseline data reveal a mean percentage of scores of 2 on the Responsiveness subscale of 35% (*range* = 0.21-0.52). Increased frequencies of scores of 2 for responsive behaviors were evidenced during the intervention phase (*mean* = 96%; *range* = 79%-100%). Her intervention phase performance data are stable with a zero-celerating trend line due to the high concentration of percentages of scores of 2 in the upper range (79%-100%). Caregiver 2 sustained a high percentage of scores of 2 for responsive behaviors during the maintenance (*mean* = 96%, *range* = 86%-100%) and generalization (*mean* = 83%, *range* = 57%-100%) routines. She demonstrated stable performance data throughout the intervention and maintenance phases, but her generalization data are variable. Caregiver 2's

baseline data points do not overlap with the intervention data points, nor with the maintenance or generalization data points.

Caregiver 3. Figure 2 indicates that Caregiver 3 demonstrated stable baseline performance with 100% data points falling within the stability envelope, a zero-celerating trend line, and an average of scores of 2 of 53% (*range* = 43%-60%) on the Responsiveness subscale. Once coaching was introduced, Caregiver 3 demonstrated an immediate increase in her percentages of scores of 2 (*mean* = 92%, *range* = 69%-100%). Her intervention performance data are stable and form a zero-celerating trend line because most of the percentages of scores of 2 are clustered close to 100%. She continued to sustain these high percentages of scores of 2 during the maintenance and generalization routines. Caregiver 3's performance data show 100% PND between the baseline and the intervention phases. Maintenance and generalization data points overlap with the intervention data but not with the baseline data.

Caregiver 4. As depicted in Figure 2, Caregiver 4's baseline data for responsive behaviors are stable with a slightly accelerating trend line. Her average of scores of 2 on the Responsiveness subscale during the baseline phase was 41% (*range* = 32%-48%). Caregiver 4's percentages of scores of 2 increased abruptly with the introduction of coaching (*mean* = 93%; *range* = 86%-100%). Her intervention phase data are stable with a slightly accelerating trend line. Analysis of level change from the baseline to the intervention phase yielded 100% PND. Her percentages of scores of 2 slightly decreased during the maintenance (*mean* = 82%, *range* = 64%-93%) and generalization (*mean* = 77, *range* = 57%-100%) routines. Despite variability and lower slopes, Caregiver 4's performance data indicate 100% PND, demonstrating increased levels of responsive behaviors from the baseline to the maintenance and generalization phases.

Encouragement. Caregivers' encouragement was measured with the Encouragement subscale of the *PICCOLO*. Figure 3 displays the averages of percentages of scores of 2 for the parenting behaviors associated with encouragement.

EXAMINING CAREGIVERS' INDEPENDENCE

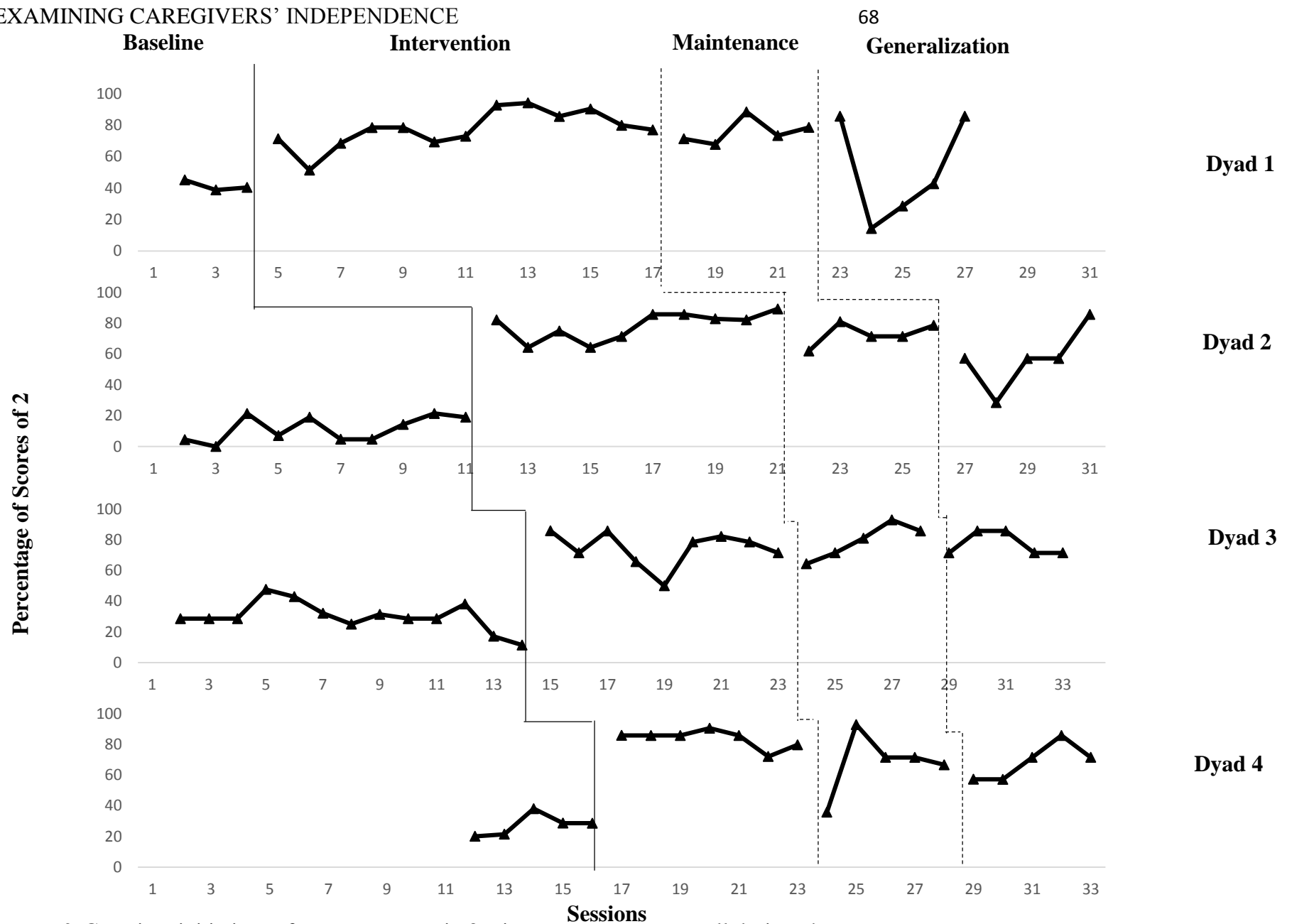


Figure 3. Caregiver initiations of encouragement in 3 minute segments across all design phases.

Caregiver 1. Caregiver 1 demonstrated a zero-celerating trend line and variable baseline performance with 67% of points falling within the stability envelope. Figure 3 shows low levels of percentages of scores of 2 for the Encouragement subscale during the baseline sessions (*mean* = 39%, *range* = 32%-45%). Upon the introduction of coaching, Caregiver 1 immediately demonstrated improved and increasing levels of percentages of scores of 2 for encouragement behaviors (*mean* = 78%; *range* = 51%-94%). The trend line during the intervention condition was slightly accelerating and relatively stable with 69% of data points falling within the stability envelope. Caregiver 1 presented with 100% PND between the intervention and baseline phases. Percentages of scores of 2 for the behaviors associated with encouragement were sustained throughout the maintenance phase (*mean* = 76%, *range* = 68%-89%). Caregiver 1 started with a high percentage during the first generalization session, but her scores decreased to below the baseline level during the second generalization session. Her scores showed a steady accelerating trend during the third and fourth generalization sessions, but continued to remain below the baseline level. Caregiver 1's performance data show 100% PND between the baseline and the intervention phases. Maintenance data points overlap with the intervention data but not with the baseline data.

Caregiver 2. As shown in Figure 3, Caregiver 2 presented with variable baseline data and a zero-celerating trend line. Her baseline performance indicated an average of scores of 2 of 12% (*range* = 0-21%) on the Encouragement subscale. Caregiver 2 demonstrated a significant and abrupt level change between the baseline and intervention phases. Her intervention performance data show an average increase of scores of 2 to 78% (*range* = 64%- 89%). Her intervention performance data are variable but her intervention data points do not overlap with her baseline data points (PND = 100%). Caregiver 2 sustained high percentages of scores of 2

for behaviors associated with encouragement throughout the maintenance routines (*mean* = 73, *range* = 62%-81%), but they slightly decreased during the generalization routine (*mean* = 57%, *range* = 29%-86%). Despite variability across all phases, PND results for Caregiver 2 show 100% non-overlap between the baseline and intervention data points and 100% non-overlap between the baseline data points and the maintenance and generalization data points.

Caregiver 3. As depicted in Figure 3, Caregiver 3's baseline performance for behaviors associated with encouragement demonstrate variability and a slightly decelerating trend line. The average of scores of 2 on the Encouragement subscale during the baseline phase was 30% (*range* = 11%-48%). A steep increase in the percentages of scores of 2 was observed after coaching was introduced. During the intervention phase, Caregiver 3 demonstrated an average percentage of scores of 2 of 74% (*range* = 50%-86%) and a zero-celerating trend line for the caregiving behaviors associated with encouragement. Although the intervention data are variable, the PND results for Caregiver 3 show no overlap of intervention data points with baseline data points. Percentages of scores of 2 for the behaviors associated with encouragement were sustained throughout both the maintenance (*mean* = 79; *range* = 64%-93%) and generalization (*mean* = 77%, *range* = 71-86%) phases. Maintenance and generalization data points overlap with the intervention data points but they do not reach the baseline level (PND for baseline and maintenance conditions = 100%, PND for baseline and generalization conditions = 100%).

Caregiver 4. As illustrated in Figure 3, Caregiver 4's performance data demonstrate a slightly accelerating trend line and stable baseline performance with 80% of the data points falling within the stability envelope. The average score of 2 on the Encouragement subscale during the baseline phase was 27% (*range* = 20%-38%). A noticeable change in the percentages

of scores of 2 on the Encouragement subscale was observed when coaching was introduced. Caregiver 4's intervention data reveal an average increase of scores of 2 to 84% (*range* = 72%-90%) during the intervention phase. The data are stable (86% of intervention data points fall within the stability envelope) but the trend is slightly decelerating. The percentages of scores of 2 slightly decreased during the maintenance (*mean* = 68%, *range* = 36%-93%) and generalization (*mean* = 68, *range* = 57%-86%) routines. Despite variability and lower slopes, PND = 100% between baseline data points and maintenance/generalization data points, indicating Caregiver 4's increased levels of behaviors associated with encouragement.

Affection. Caregivers' affection toward their children was measured with the Affection subscale of the *PICCOLO*. Figure 4 displays the average percentages of scores of 2 in 3-min segments of the caregivers' parenting behaviors associated with affection.

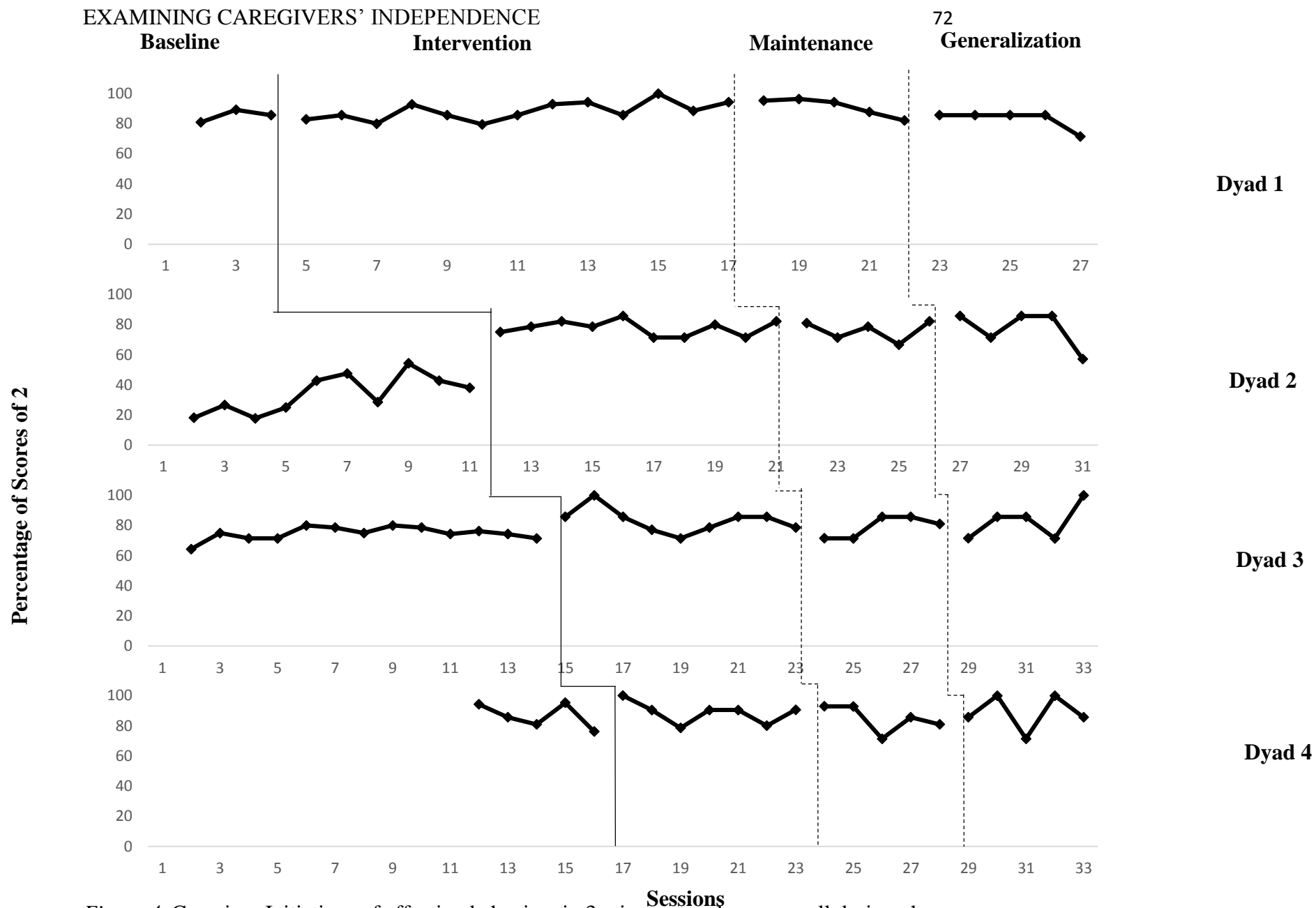


Figure 4. Caregiver Initiations of affection behaviors in 3 minute samples across all design phases

Caregiver 1. Per Figure 4, Caregiver 1's baseline performance data are stable with a slightly accelerating trend line and high levels of percentages of scores of 2 on the Affection subscale ($mean = 85\%$, $range = 81\%-89\%$). Caregiver 1 continued to sustain her high Affection scores throughout the intervention ($mean = 88\%$, $range = 80\%-100\%$), maintenance ($mean = 91\%$, $range = 82\%-96\%$), and generalization ($mean = 83\%$, $range = 71\%-86\%$) phases. Caregiver 1's intervention performance data are also stable with a slightly accelerating trend line. During the maintenance and generalization phases she demonstrated stable performance with a slightly decelerating trend line. Although Caregiver 1's intervention, maintenance, and generalization data points significantly overlap with her baseline data points, her Affection scores continued to remain in the upper range (71%-96%).

Caregiver 2. As shown in Figure 4, Caregiver 2 demonstrated variable baseline performance and an accelerating baseline data trend line. Low levels of percentages of scores of 2 were evidenced during the baseline condition ($mean = 34\%$, $range = 18\%-54\%$). Upon the introduction of coaching, Caregiver 2 demonstrated an immediate increase in her percentages of scores of 2 for affection behaviors ($mean = 78\%$; $range = 71\%-86\%$). Her intervention data are relatively stable with a zero-celerating trend line. Caregiver 2 continued to maintain her high scores throughout the maintenance ($mean = 76\%$, $range = 67\%-82\%$) and generalization ($mean = 77\%$, $range = 57\%-86\%$) conditions. Likewise, her maintenance performance data indicate stability and a zero-celerating trend line. Caregiver 2's generalization performance data show variability and a slightly decelerating trend line. There is no overlap between the baseline data points and the intervention, maintenance, and generalization data points (PND = 100%).

Caregiver 3. As depicted in Figure 4, Caregiver 3 evidenced stable baseline performance and high percentages of scores of 2 on the Affection subscale across the baseline sessions ($mean$

= 75%, *range* = 64%-80%). She continued to maintain her high Affection scores throughout the intervention (*mean* = 83%, *range* = 71%-100%), maintenance (*mean* = 79%, *range* = 71%-86%), and generalization (*mean* = 83%, *range* = 71%-100%) phases. Caregiver 3 demonstrated an overall slightly decelerating but stable trend and slope during intervention. During the maintenance and generalization phases, performance data were stable and the trend line was slightly accelerating. Despite low PND across all design phases (*range* = 56%-60%), Caregiver 3's Affection scores continued to remain in the upper range.

Caregiver 4. As illustrated in Figure 4, Caregiver 4's baseline performance indicated stable, high levels of percentages of scores 2 on the Affection subscale (*mean* = 86%, *range* = 76%-95%) with a decelerating trend line. She sustained these high scores throughout the intervention (*mean* = 89%; *range* = 79%-100%), maintenance (*mean* = 85%, *range* = 71%-93%), and generalization (*mean* = 89%, *range* = 71%-100%) phases. Caregiver 4 demonstrated stable performance data across all conditions, with 100% of data points falling within the stability envelope. Although her performance data indicate lower slopes and there is significant overlap between data points across all design phases, Caregiver 4's Affection scores remained in the upper range (71%-100%) throughout the study.

Correspondence between Coaching Strategies and Caregiver Initiations of Development-Promoting Behaviors

Aggregated data. The frequency counts of provider and caregiver initiations during the intervention phase were aggregated to provide a preliminary understanding of the correspondence between the specific coaching strategies and caregiver independent use of two development-promoting behaviors — teaching, and gathering and sharing information. Because the caregiver behaviors associated with responsiveness, encouragement, and affection were

coded with the *PICCOLO* rating scale, a measurement system which does not accurately capture the frequency of each behavior, they were not included in the aggregated data.

Proportions of caregiver and provider initiations across dyads. The proportion of initiations across dyads was determined by comparing the number of strategies initiated by the caregiver (teaching, and gathering and sharing information) to the number of strategies initiated by the provider (SOOPR). As shown in Figure 5, the caregiver-initiated behaviors equaled or exceeded the provider-initiated behaviors (caregiver *range* = 50%-64%; provider range: 36%-50%).

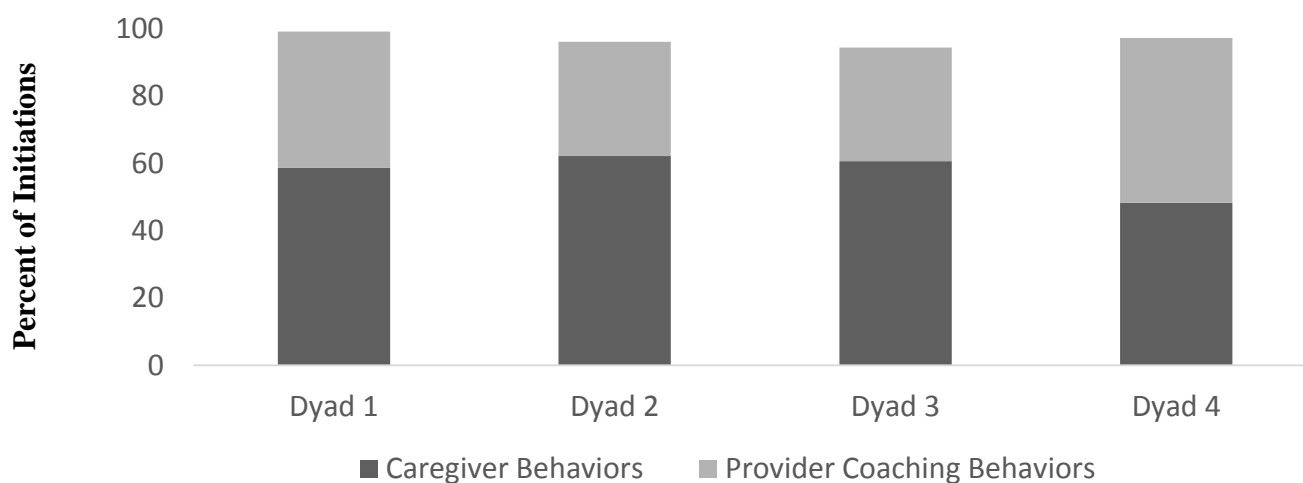


Figure 5. Proportion of initiations for each dyad.

Note: Caregiver Behaviors: Teaching, and Gathering and Sharing Information; Provider Coaching Behaviors: Setting the Stage, Observation, Opportunities to Practice, Problem Solving and Reflection, and Review.

Proportions of coaching strategies across dyads. The proportions of coaching strategies used in each dyad by the provider (SOOPR) were determined by comparing how often the five coaching strategies occurred within each coded interval. As shown in Figure 6, with all four dyads, the provider engaged in Opportunities to Practice (Direct Teaching, Demonstration with Narration, Feedback, and Guided Practice) at the highest rates. The percentages ranged from 51% to 59%, indicating that at least half of the coaching behaviors were aimed at providing opportunities for the caregiver to embed the four teaching strategies (environmental arrangement, contingent responding, wait time, and prompting) into families' routines. The other coaching strategies occurred at lower rates: Problem Solving and Reflection (*range* = 11-17%), Review (*range* = 11-15%), Setting the Stage (*range* = 10-13%), and Observation (*range* = 4-11%).

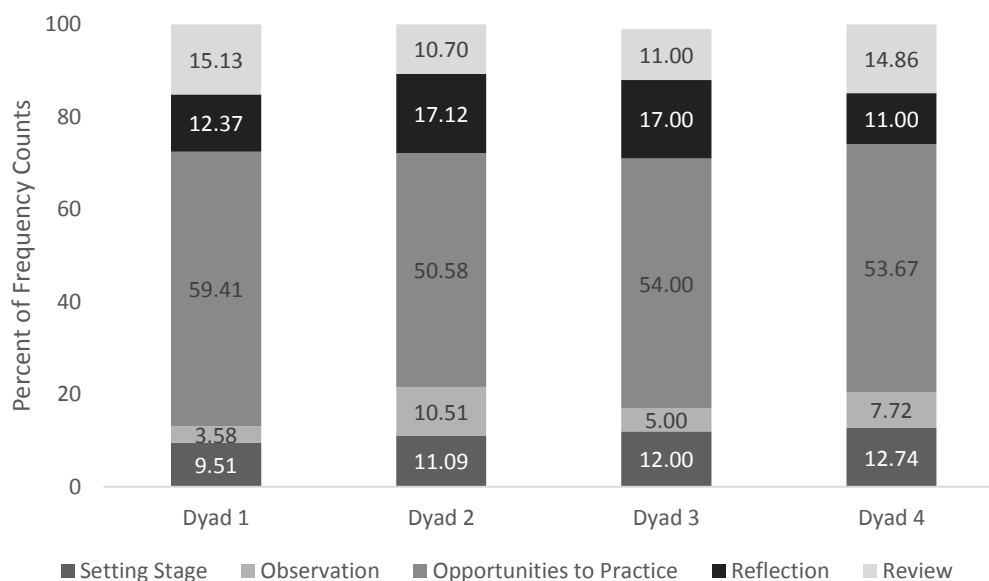


Figure 6. Density of coaching strategies for each dyad.

Patterns between variables. The patterns between variables were determined by comparing the frequency counts of specific coaching strategies (Observation, Opportunities to Practice and Reflection; reflected as percentages of the aggregate count) with caregiver initiations measured in (a) rate per min (teaching, and gathering and sharing information), and (b) the percentage of scores of 2 in the 3-min segments (responsiveness, encouragement, and affection) across sessions. In addition, the rate of increase in caregiver initiations for each dyad was graphed together with the aggregated percentages of caregiver initiations of teaching strategies and gathering and sharing information behaviors to determine whether there was a correspondence between the frequency of caregivers' initiations during the intervention and caregivers' improved ability to use the teaching strategies after the intervention was complete.

Descriptive data depicting (a) the percentage of aggregated specific coaching behaviors initiated by the provider (Observation, Opportunities to Practice, and Reflection), and the rate per min of caregiver initiations of behaviors for (b) teaching and (c) gathering and sharing information, across the intervention sessions are presented in Figure 7. The percentage of aggregated specific coaching behaviors initiated by the provider (observation, opportunities to practice, and reflection), and the percentages of scores of 2 of caregiver initiations of responsiveness, encouragement, , and affection during the intervention phase are illustrated in Figures 8, 9, and 10, respectively. The rate of increase in caregiver initiations and aggregated percentages of caregiver initiations of teaching, and gathering and sharing information during the intervention sessions are depicted in Figure 11.

All four caregivers initiated behaviors associated with teaching, responsiveness, encouragement, and affection with a high frequency from the onset of the intervention. Overall, the frequency of these behaviors slightly increased during the second half of the intervention.

The provider initiated interactions at a higher rate during the first part of the intervention, and her initiations slightly decreased toward the end of the intervention.

As seen in Figure 7, during the first half of the intervention, the data show inconsistent patterns between specific coaching strategies and caregiver initiations of teaching. During the second half of the intervention, specific coaching strategies were inversely proportional to caregiver initiations of teaching strategies. When the rate per min of caregiver teaching behaviors decreases (e.g., Dyad 2 Session 7, and Dyad 1 Session 11), the percentage of specific coaching strategies increases. As the rate per min of caregiver initiation of teaching strategies increases, the percentage of specific coaching strategies decreases. This inverse relationship is what would be expected if the coaching process were implemented as intended.

Caregivers initiated conversations to gather and share information at a low rate. As shown in Figure 7, no consistent patterns between specific coaching strategies and caregiver initiations of gathering and sharing information were demonstrated.

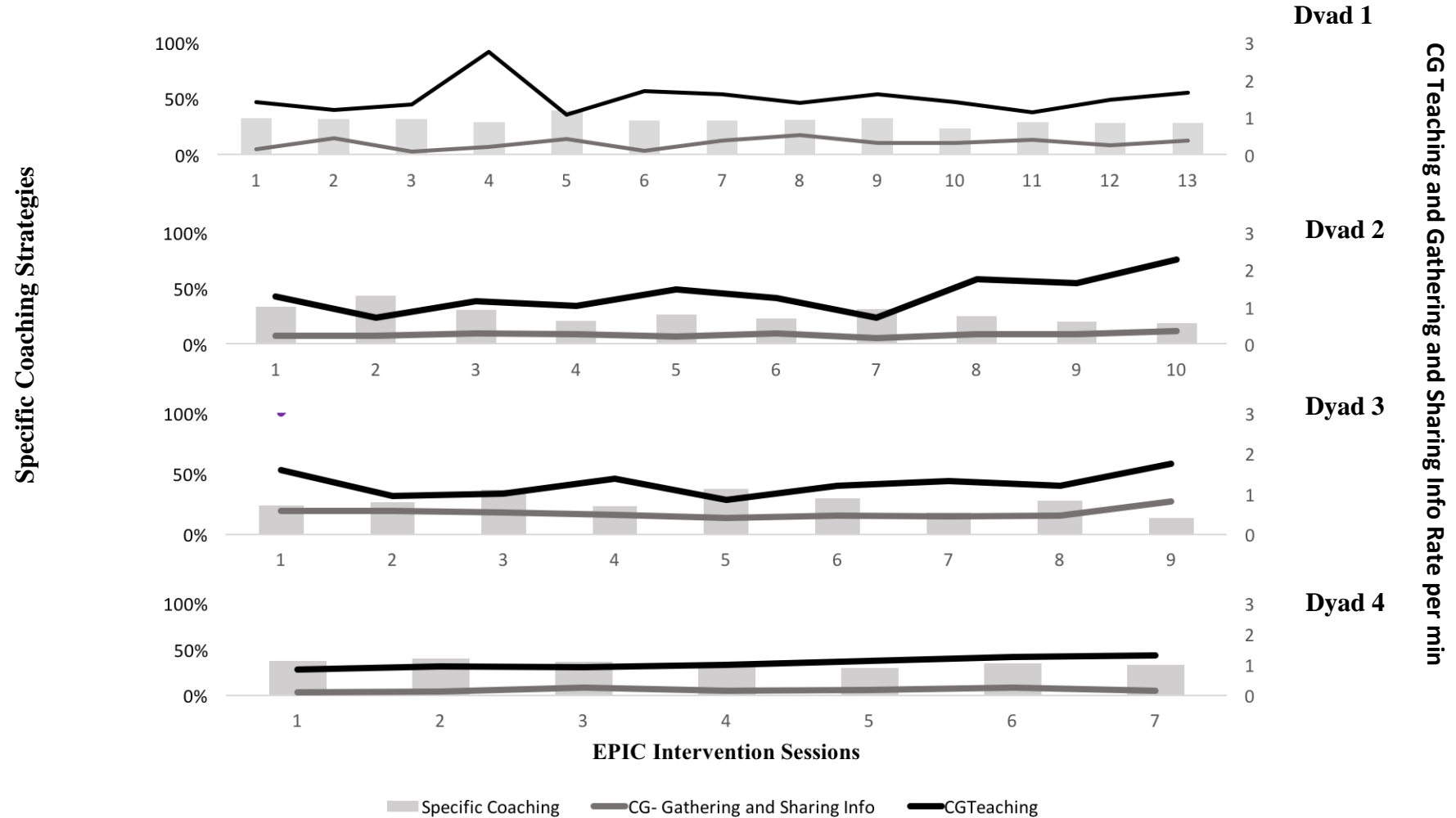


Figure 7. Specific coaching behaviors and caregiver initiations of teaching, and gathering and sharing information during the intervention phase.
Note: Specific Coaching Behaviors: Opportunities to Practice (Direct Teaching, Demonstration with Narration, Guided Practice, General Feedback, and Specific Feedback), Observation, and Reflection and Problem Solving; Caregiver Teaching: Environmental Arrangement, Contingent Responding, Wait Time, and Prompting; Caregiver gatherers and shares information about: routine, learning target and strategies.

As seen in Figure 8, across dyads, the data show inconsistent patterns between specific coaching strategies and caregiver initiations of responsive behaviors. The data for Dyad 1 illustrate predominantly an inversely proportional relationship between caregiver initiations of responsiveness and specific coaching, while the data for Dyad 3 depict a directly proportional relation. The data for Dyad 2 and 4 demonstrate a directly proportional relation at the beginning of the intervention and an inversely proportional relation toward the end of the intervention. The inconsistent patterns may be due to the limitations of the data set and the design method used for this study, as explained at the end of this section.

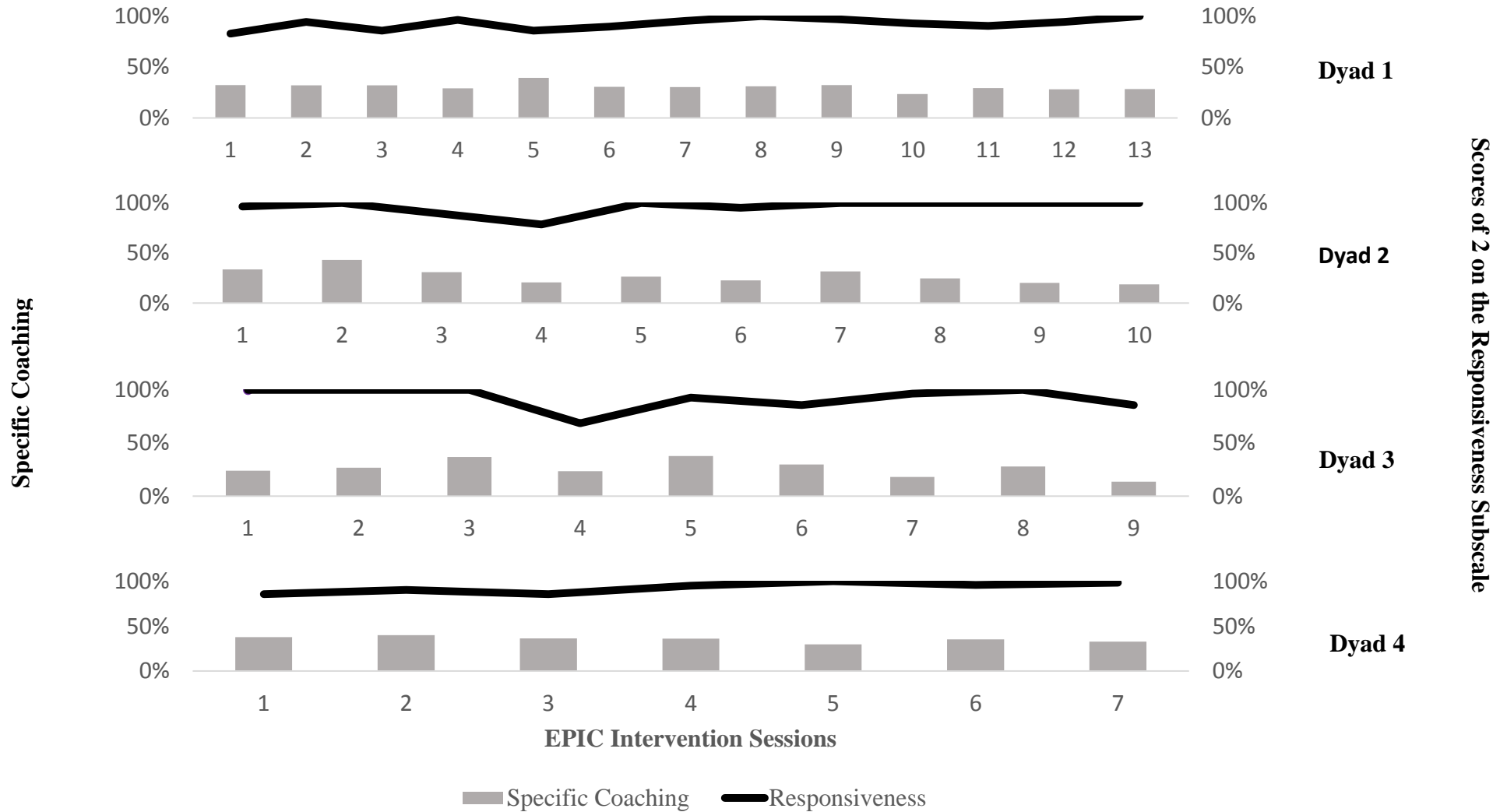


Figure 8. Specific coaching strategies and caregiver initiations of responsiveness during the intervention phase.

Note: Specific Coaching Behaviors: Opportunities to Practice (Direct Teaching, Demonstration with Narration, Guided Practice, General Feedback, and Specific Feedback), Observation, and Reflection and Problem Solving.

As shown in Figure 9, the coaching and caregiver initiations of encouragement data are variable across all dyads. Inversely and directly proportional patterns alternate during the first half of the intervention. Toward the end of the intervention, the data show inconsistent patterns. Dyads 1 and 2 demonstrate a directly proportional relation between coaching and caregiver initiations of encouragement, while Dyads 3 and 4 demonstrated an inversely proportional relation.

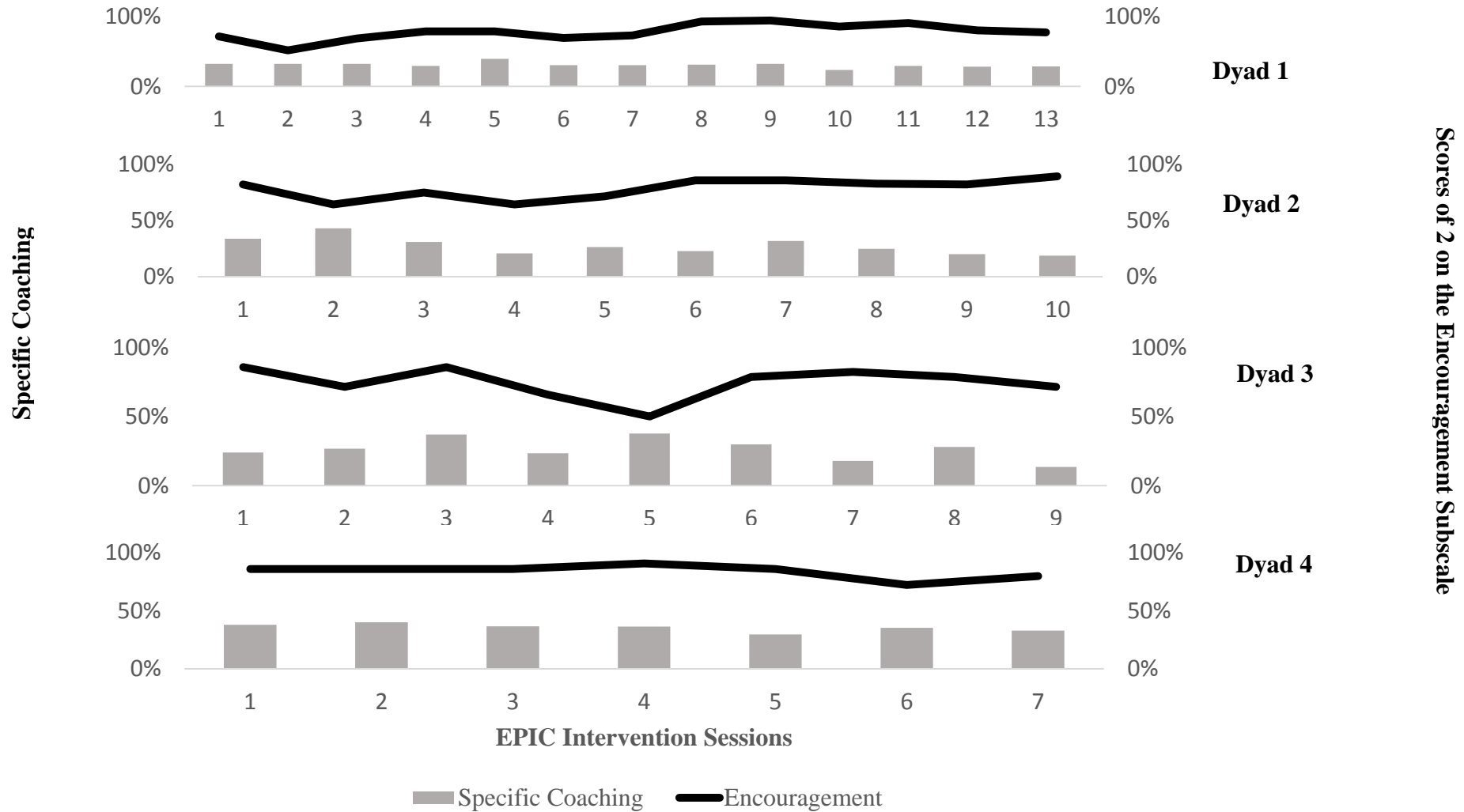


Figure 9. Specific coaching strategies and caregiver initiations of encouragement during the intervention phase.

Note: Specific Coaching Behaviors: Opportunities to Practice (Direct Teaching, Demonstration with Narration, Guided Practice, General Feedback, and Specific Feedback), Observation, and Reflection and Problem Solving

As shown in Figure 10, the coaching and caregiver initiations of affection data are variable across all dyads. Indirect and direct proportional relations alternate during the first half of the intervention. The data for Dyad 1 show predominantly a directly proportional relation between caregiver initiations of affection and specific coaching toward the end of the intervention, while the data for Dyad 2, 3, and 4 demonstrate a predominantly inversely proportional relation toward the end of the intervention.

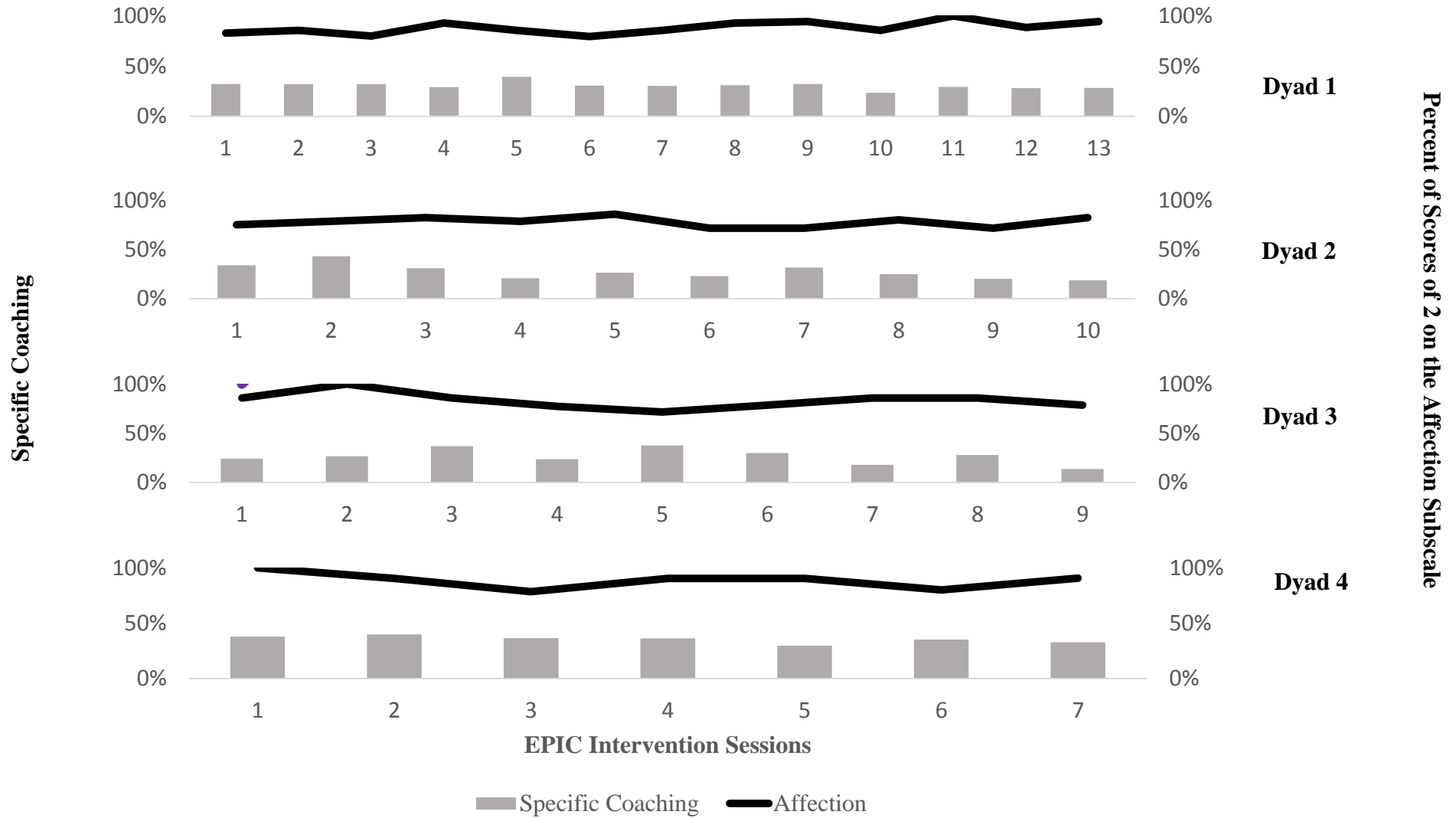


Figure 10. Specific coaching strategies and caregiver initiations of affection during the intervention phase.

Note: Specific Coaching Behaviors: Opportunities to Practice (Direct Teaching, Demonstration with Narration, Guided Practice, General Feedback, and Specific Feedback), Observation, and Reflection and Problem Solving.

As depicted in Figure 11, the slope (ascending or descending) between any two data points is the same in five out of six possible comparisons (i.e., the total number of slope comparisons is six because it is equal to the combinations of four taken by two at a time). Specifically, Figure 11 shows a consistent pattern of direct proportionality between the two variables (caregiver rate of improvement after the intervention and caregiver initiations during the intervention) for the following data points: 1-2, 2-3, 3-4, 1-3, and 2-4. The only exception is the comparison of 1-4, for which the rate of increase in caregiver initiations has an ascending slope, while the percentage of initiations during the intervention shows a descending slope. This may be due to contextual factors such as the fact that Child 1 cried during three of the generalization sessions, which likely brought down the rate increase of Caregiver 1's teaching initiations.

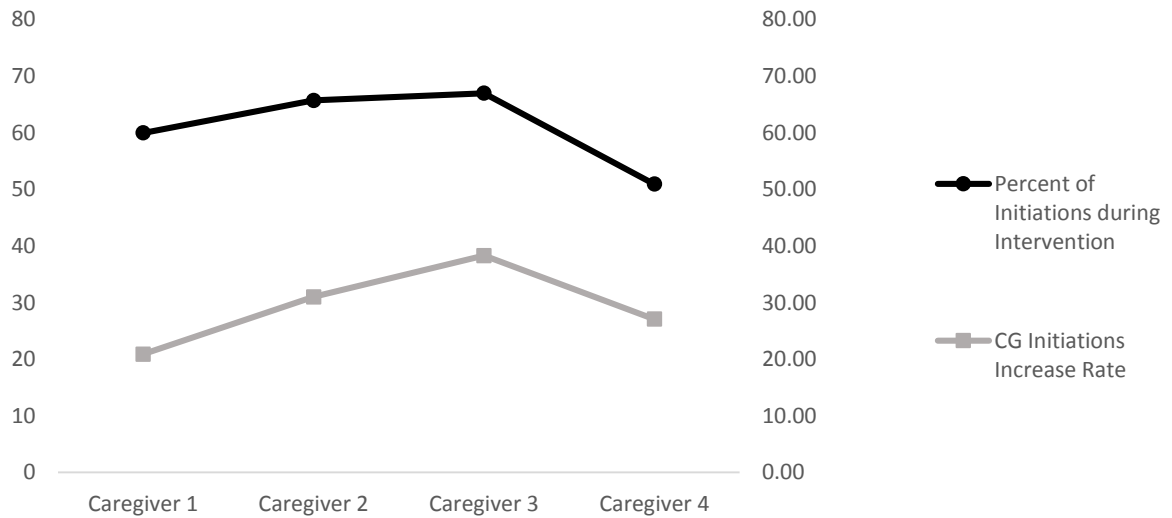


Figure 11. Caregivers' use of strategies during the session and their rate of improvement after the intervention.

Note: Caregiver initiations increase rate: increase rate between baseline, maintenance, and generalization. Percentage of initiations during intervention: aggregated percentages of caregiver initiations of teaching, and gathering and sharing information during intervention sessions.

These various analyses reveal that only one pattern emerged from the descriptive data – the correspondence between caregivers' initiations during the session and their improved ability to use the teaching strategies after the completion of the intervention. There is no evidence to suggest that there is a correspondence between specific coaching strategies and the increase in caregiver initiations. Moreover, no consistent patterns were found between individual coaching strategies and caregiver initiations. It thus became apparent that the single-subject multiple baseline design (with its small sample size) was not suitable to identify the hypothesized correspondence in the second research question between specific coaching strategies and

changes in caregiver independent use of behaviors associated with teaching, responsiveness, encouragement, and affection.

Fidelity

Fidelity was monitored in the context of the EPIC project for all intervention sessions to ensure that the provider implemented the intervention components as planned and that the caregivers implemented the intervention model as intended. Thirty percent of the sessions were randomly selected and independently scored to ensure ongoing reliability of coding. Reliability for the double-coded sessions generated 89.61% agreement for provider's implementation fidelity and 92.53% agreement for caregiver's intervention fidelity. The provider's implementation fidelity averaged 80% (range 67%-92%). Caregivers' intervention fidelity was measured for five behaviors: (a) description of child's learning targets (mean = 72%, range = 50%-90%), (b) demonstration of teaching strategies (mean = 100%), (b) description of teaching strategies (mean = 72%, range=25%-100%), (c) description of the context of the intervention (mean = 61%, range = 50%-90%), and (d) description of child progress (mean = 63%, range = 44%-90%).

Social Validity

Caregivers' perspectives of coaching. As reported by Salisbury et al (2017), all caregivers across the EPIC project's three sites found the SOOPR coaching practices and the EPIC approach useful and feasible as measured by the Caregiver Feedback Survey (see Appendix E). Examination of the interview data from the Chicago site indicates that all four caregivers felt that Observation and Specific Feedback played a major role in understanding how to promote their child's learning. They noted that having the provider observe their interaction

with the child and then being coach allowed them to understand what to do, how to do it, and the role of the strategy.

She [the provider] observed and then ... gave us ideas. Like she gave us that idea and then she also corrected A. [the father] because A. would just be like 'block, block, block' and he would just continue like we used to, and then what K. [the provider] made us realize [was] ... that we have to do *wait time* because you gotta make sure he [child] processes the information.

Another caregiver pointed out that Observation and Specific Feedback supported her to continue to use the strategies between sessions - "If I did something that was good, like expansion, then she [the provider] would point it out to me and I thought that that was helpful ... 'Oh, okay. I did that right so I should try to do that again later.'" Another caregiver emphasized that the combination of observation, specific feedback and demonstration "was probably the most useful part [of the coaching] and the best way to learn." The Planning and Review components of the SOOPR coaching process were also highly appreciated by caregivers. These components afforded them the opportunity to review their child's learning targets and the teaching strategies used to achieve these targets, identify additional activities/routines that serve as contexts for learning, and, finally, find ways to measure their child's progress. Caregivers indicated that Planning and Review helped them put into practice the newly acquired knowledge and skills between home visits - "this kind of consolidated the information from the session and then helped us to have goals for the week". Moreover, the coaching practices also helped caregivers expand the use of the teaching strategies across various activities - " [the plan] helped me realize that I could do that [use the teaching strategies] anytime ... [I used the] communication [strategies] in other routines like getting dressed and brushing our teeth."

Caregivers' perspectives of teaching strategies. In the EPIC project, caregivers learned four evidence-based teaching strategies: environmental arrangement, contingent responding, wait time, and prompting. Each parent in the Chicago site reported using the teaching strategies either multiple times during the day or every day. The Caregiver Feedback Survey data corroborate the positive commentaries from the interviews about the consistency with which caregivers used the teaching strategies – “I daily, daily, daily use the *verbal prompting* and the *wait time*”. The other caregivers had similar comments regarding the use of the teaching strategies. Moreover, caregivers were unanimous in their views of how the interaction with their child changed across time and how effective they feel in supporting their child's learning in the context of daily routines after participating in the EPIC project. One parent noted

Before, I was putting everything into a bowl and then giving it to him. But now with EPIC I ... focus on giving him two things ... and focus on making him choose between those two things. I pretty much have him either imitate me or try to say it ... because that's what he's doing a lot now. That's mostly what I've been doing since I started with the EPIC project.

Another caregiver indicated that she became more intentional in identifying learning opportunities across everyday routines and supporting her child's communication skills after participating in the EPIC project – “now we ... play with a purpose instead of just playing to play ... I focus on trying to get him to do specific things as far as communication or fine motor skills. ... I focus on trying to do this consciously”. Finally, all caregivers in this sample reported that the EPIC approach helped them take a more active role in teaching their children and they felt more confident in supporting their children's development.

V. DISCUSSION

The purpose of this study was to extend the research on caregiver coaching by examining how a delineated coaching process affects the ability of caregivers to take the lead in promoting their children's development in the context of daily activities. The results of this investigation contribute to the EI literature in four ways. First, it provides insights into the role that coaching can play in promoting caregivers' ability to take the lead in EI sessions. Second, it offers evidence about the impact of coaching on caregivers' independent use of four behaviors that have been empirically associated with positive child outcomes: teaching, responsiveness, encouragement, and affection (Innocenti et al., 2013; Roggman et al., 2013). Specifically, this investigation demonstrated that the SOOPR coaching framework is effective in teaching caregivers to independently use behaviors that foster child learning (teaching and responsiveness), and enhance caregiver-child relationships (encouragement) both during and after the intervention. Third, although this investigation did not identify specific coaching strategies that correspond to an increase in caregiver initiations, the descriptive data across sessions for each triad suggest that as the intervention progressed, the frequency of specific coaching strategies decreased and this may have fostered the caregivers' opportunities to take the lead in the sessions. Finally, the descriptive data suggest that caregiver initiations during the intervention may be linked to caregivers' improved ability to use the teaching strategies subsequent to intervention (i.e., during maintenance). These findings are important because the SOOPR coaching approach aligns with policy requirements (IDEA, 2004) and recommended practices in the field of EI for building caregivers' competence to support their children's learning and development in the context of families' routines and activities (DEC, 2014).

Examining intervention approaches that support caregivers' self-sufficiency, such as occurred in this study, provides a foundation for bridging the research-to-practice gap.

Caregiver Initiations of Teaching, Responsiveness, Encouragement, and Affection

Each of the caregivers demonstrated an immediate increase in their rate of unprompted behaviors associated with teaching, responsiveness, and encouragement during the intervention phase. These behaviors remained above the baseline level during the maintenance and generalization phases. These data provide evidence of a functional relation between the SOOPR coaching model and caregiver initiations of teaching, responsiveness, and encouragement.

Although this study did not provide evidence that caregivers showed more affection toward their children as a result of coaching relative to the baseline phase, overall, all caregivers continued to sustain their high scores throughout the intervention, maintenance, and generalization phases.

The finding that caregivers increased their use of strategies that promote children's learning (teaching and responsiveness) after participating in coaching-based sessions aligns with existing research about caregiver-implemented intervention (e.g., Brown & Woods, 2015; Kashinath et al., 2006). Although other studies have examined caregiver-implemented intervention in families' homes using provider-suggested activities as contexts for intervention (e.g., Vismara et al., 2012), few were implemented entirely in families' preferred activities and routines (e.g., Brown & Woods, 2015; Kashinath et al., 2006). These studies were focused solely on coaching caregivers to use teaching and responsive strategies with their children, but did not measure unprompted and prompted caregiver strategy use, and did not examine the impact of coaching on caregiver behaviors associated with encouragement and affection. The current study deepens the field's understandings about caregiver coaching by providing evidence that not only can caregivers be more responsive toward their children and create opportunities for

them to learn in the context of their preferred daily activities, they can also take the lead in intervention sessions by initiating a range of development-promoting behaviors (i.e., teaching, responsiveness, encouragement, and affection).

Findings from this study also suggest that these caregiver-initiated behaviors were sustained in the trained (maintenance) and untrained (generalization) routines after the intervention ended. Insofar as all four caregiver behaviors are considered necessary for maximizing children's development (Roggman et al., 2013), this study supports the value and preliminary efficacy of the SOOPR coaching process for building caregivers' capacity to enact three of these behaviors – teaching, responsiveness, and encouragement. Additional research is needed to demonstrate the role of coaching in supporting caregivers to express affectionate behaviors toward their children.

Among all development-promoting behaviors, teaching appears to show the largest increase. Across dyads, as compared to baseline performance, the average rate per min of caregiver initiations of teaching strategies increased nine-fold during the maintenance condition and 11-fold during the generalization condition. Across all dyads, the average percentages of scores of 2 for responsiveness and encouragement doubled during the maintenance and generalization phases as compared to the baseline phase. When comparing caregiver initiations of development-promoting behaviors, it is important to note that two different systems of measurement were used to quantify the behaviors: (a) an event-recording procedure (the teaching behaviors were measured in rate per min) and (b) the *PICCOLO* rating scale (responsiveness, encouragement, and affection behaviors were represented as percentages of scores of 2 in 3-min segments). The *PICCOLO* rating scale does not accurately capture the frequency of the behaviors (for a score of 2 the caregiver had to demonstrate two or more behaviors in a 3-min

interval). While the increase of caregiver initiations is obvious for all behaviors regardless of the method of measurement, it is not appropriate to compare the increased ratios between teaching and the behaviors measured by *PICCOLO* (responsiveness, encouragement, and affection).

All caregivers had at least one session in which they earned scores of 2 for all the behaviors included in the responsiveness and affection subscale. All caregivers, except Caregiver 2, had at least one session in which they earned scores of 2 for all the behaviors included in the affection subscale. Caregiver 2 did not use an affectionate nickname with her child and, consequently, her maximum percentage of scores of 2 was 86% (she earned a score of 2 for six out of seven behaviors). On the encouragement subscale, no caregiver had 100% scores of 2 in any session. One possible explanation is the nature of the routine. Caregivers had fewer opportunities during the caregiving routines (i.e., snack, getting dressed, and hand washing) to initiate all seven behaviors associated with encouragement. In addition, for a score of 2 the parent had to enact each behavior at least twice. For example, supporting the child to make choices while washing hands is an item for which caregivers frequently scored 0. This may be because it was not natural for caregivers to embed choices during the hand washing routine. Throughout the intervention, caregivers were encouraged to use the strategies while preserving the integrity of their routines. Other studies of caregiver-implemented intervention report similar findings with regard to the limited number of opportunities for caregivers to use a teaching strategy during caregiving routines (Brown & Woods, 2015; Kashinath et al., 2006; Windsor, 2016).

Another factor that may have influenced the rate of scores of 2 on the Encouragement subscale is the nature of the behavior itself. One such behavior is waiting for the child's response after making a suggestion or asking a question. It is possible that the child responded

promptly and the wait time was not necessary, thus resulting in a score of 0. Another behavior with low frequency of scores of 2 is showing verbal enthusiasm. This item is contingent upon the child. Sometimes the child was in a negative mood (threw tantrums or cried) throughout the entire duration of the interval. Therefore, it was inappropriate for the caregiver to offer praise for the effort (e.g., “there you go” or “you did it”). Although routines differ in the number of opportunities to embed strategies associated with encouragement and certain items are contingent on children’s behavior, all caregivers were able to maintain a high percentage of scores of 2 for encouragement across all design phases with one exception. Caregiver 1 had three out of five generalization sessions that overlapped with the baseline data points. Her child cried throughout these three routines.

Previous studies have shown positive caregiver outcomes during intervention phases, but there is limited evidence supporting the maintenance and generalization of caregiver outcomes (Barton & Fettig, 2013; Kashinath et al., 2006). It is widely acknowledged that the maintenance and generalization of caregiver use of intervention practices are important features of caregiver-implemented interventions because they ensure the sustainability of the newly acquired skills (Kashinath et al., 2006). The EPIC intervention included coaching strategies aimed at facilitating maintenance and generalization across settings, learning targets, and people. Throughout intervention, the EI provider supported the caregiver to think of ways in which she would implement the strategies in the two trained routines (play and caregiving) between sessions. In addition, the provider encouraged the caregivers to identify new routines and activities that would serve as contexts for teaching current or new learning targets. Finally, the caregivers were encouraged to identify and share the strategies with other caregivers (e.g., teachers and extended family) with whom the children could practice their learning targets. In

addition, throughout the intervention phase, the EI provider supported the caregivers to use teaching strategies during both play and caregiving activities. Supporting caregivers to practice intervention strategies in different contexts is critical in promoting their skill maintenance and generalization (Dunst, 2014; Woods & Kashinath, 2007). Maintenance data were obtained by measuring caregivers' use of development-promoting behaviors in the two trained routines: play and caregiving. Generalization data were obtained by measuring caregivers' use of development-promoting behaviors in a new untrained routine. Maintenance and generalization findings in this study demonstrated that caregivers were able to generalize the use of teaching and responsive strategies across routines; a finding that is consistent with previous caregiver-implemented investigations conducted in natural settings (Barton & Fettig, 2013; Kashinath et al., 2006; Roberts & Kaiser, 2011). Taken together, findings from this investigation support the overall value of the SOOPR coaching framework and its effectiveness for teaching caregivers to identify learning opportunities and embed interventions strategies in various contexts.

Potential Sources of Variability

Generally, all four caregivers increased their rate of teaching strategies and percentages of scores of 2 for responsiveness and encouragement behaviors across all design phases, but the data were variable. The most variable patterns were evident after the introduction of the IV (the SOOPR coaching process) for the caregiver initiations associated with teaching and encouragement, with a mean of 47% of data points falling within the stability envelope for encouragement and a mean of 14% for teaching. Two factors may have potentially contributed to the variability of the outcomes. First, the nature of strategy itself may have influenced the rate of caregiver initiations. For example, the use of expansion and contingent imitation were dependent on the children's initiations of communication or motor acts. Children with low rates

of interaction provided fewer opportunities for caregivers to imitate or expand on their utterances or gestures. For instance, Child 1 produced several vocalizations during the fourth intervention session and during the first maintenance and generalization session. Consequently, the caregiver produced high rates of contingent imitation and these sessions were above the stability envelope. Similarly, a few encouragement behaviors were contingent on the child's initiations.

Consequently, the significant developmental delays of the children in this study may have resulted in caregivers having fewer opportunities to demonstrate these behaviors (e.g., supporting their children in making choices).

Another variable that may have contributed to unstable data was the presence of contextual factors, such as the children's dispositions or the presence of other family members in the sessions. These factors have been identified as potentially impacting the fidelity of implementation of coaching practices in home visiting (Moddelmog, Salisbury, & Romano, 2016), and may have also affected the frequency with which the caregivers initiated development-promoting behaviors. Field notes were taken for the sessions that fell above or below the stability envelope. In each of these sessions, one or more contextual factors were identified. For example, Caregiver 1 spent 7 out of 49 min interacting with the older sibling during the eighth session, and Caregiver 2 spent 12 out of 54 min interacting with the older sibling during the second session. The time caregivers were focused on other family members was not excluded from the analysis and this may have contributed to variable initiations of teaching strategies. The rate per min for the teaching behaviors for both of these sessions fell below the stability envelope. This study incorporated the principles of family-centered practices which emphasize the role of all family members in supporting the learning and development of

children with disabilities (DEC, 2014). Therefore, siblings and other family members were included in the sessions.

Children's disposition was another contextual factor that may have contributed in different ways to the variability of teaching and encouragement outcomes. For example, Child 1 cried throughout the second and third generalization sessions (changing clothes routine). In these sessions, the caregiver used fewer strategies for teaching and encouragement, and used affectionate behaviors at a higher rate. However, lower percentages of scores of 2 for encouragement were not always accompanied by lower rates of teaching behaviors. Caregiver 3 used teaching strategies at a high rate during the first maintenance session (3.94), but the incidence of encouragement was low (64%). Her child had a tantrum during snack time in this session. The behaviors associated with encouragement that were used with a lower frequency by Caregiver 3 were: supporting the child in making choices, offering positive comments about child activity, and offering suggestions to help the child. In this situation, the first two strategies were not appropriate because they would have reinforced the child's negative behavior. The third strategy would have been helpful but the parent missed it, and, consequently, earned a low score for this segment.

While some of these factors may have been present in different proportions in the sessions that fell within the stability envelope, only the data points that fell above and below the stability envelope were examined to identify potential contributions to the variability of the outcomes. It is outside the scope of this study to examine and describe the factors that impacted caregiver use of development-promoting behaviors. Since caregiver implementation of specific intervention procedures is an essential component of caregiver-implemented interventions (Barton & Fettig, 2013; Roberts & Kaiser, 2011), there is a need for further studies to identify

the factors that hinder or facilitate caregivers' ability to use intervention strategies with fidelity in natural environments.

Coaching Strategies and Caregiver Initiations of Development-Promoting Behaviors

Throughout the intervention phase, caregivers often acted as session leaders. The caregiver initiations in the EPIC study ranged from 50%-64% relative to the total counts of interactions. This finding differs from the Salisbury and Cushing (2013) study in which caregivers participating in a coaching intervention assumed the lead in 9% of 30-s intervals. This contrast may be related to differences in training and in the more intensive emphasis on specific coaching practices in the EPIC study. Findings from this study demonstrate that the SOOPR coaching framework was effective in promoting caregiver independence. The results of this investigation are congruent with providers' perspectives on the EPIC approach, as they felt that the SOOPR coaching model enabled them to empower caregivers to become independent in supporting their children's development (Salisbury et al., 2017). As one provider stated in that study, "you can feel yourself pulling back and turning control over...you can see caregivers as 'more powerful'" (Salisbury et al., 2017, p. 16).

The aggregated data across dyads indicate that a large proportion of the sessions were allocated to Opportunities to Practice (i.e., the provider demonstrated teaching strategies, practiced along with the caregiver, engaged in direct teaching, and offered feedback while the caregiver was practicing). This finding contrasts with those of other caregiver coaching studies in which the providers engaged in Opportunities to Practice to a lesser extent (Brown & Woods, 2015; Colyvas et al., 2010; Friedman et al., 2012; Salisbury et al., 2012; Sawyer & Campbell, 2009). These different outcomes may be related to either the emphasis on different components of the coaching process, differences in the coding definitions, limited time during the EI session,

or the need for additional professional development focused on supporting caregivers to have more “hands on” practice during EI home visits. There is no evidence in the present study that the Opportunities to Practice are responsible for caregiver independent use of development-promoting behaviors.

The data across sessions show that, on average, the provider used specific coaching strategies (Opportunities to Practice, Observation and Reflection) to a larger extent during the first part of the intervention. As caregiver initiations increased during the second part of the intervention, the frequency of specific coaching strategies decreased. This suggests that toward the end of the intervention the provider stepped back and did more observation which allowed the caregiver to take the lead in the sessions. This finding aligns with the Salisbury et al. (2017) study about providers' perspectives on the EPIC project – “you could really feel a shift from using a lot of guided practice and a lot of direct teaching early on, to kind of phasing back to more caregiver practice, see more observing, more giving pieces of feedback” (p. 16). However, there is no evidence that any specific coaching strategy contributed to increases in caregivers' initiations or independence. The research design and method of data analysis used in this study did not allow for identification of the individual coaching strategies associated with the increase in caregiver initiations of development-promoting behaviors. A component analysis design would be better suited for identifying the coaching strategies that enabled the caregivers to take the lead in the sessions.

The correspondence patterns between caregiver initiations during and after the intervention suggest that caregivers' rates of teaching skills improvement after the completion of the intervention may be related to their rates of initiations throughout the intervention phase. This finding indicates that caregivers' ability to use teaching strategies in the absence of the

provider may be associated with the frequency of initiations during EI sessions. Therefore, allowing more time for the caregiver to take the lead in the session may be critical for building competent and self-sufficient caregivers. Additional studies with larger samples and more rigorous methods of data analysis are needed to determine whether caregivers' initiations during the intervention and the use of specific coaching strategies that allow more caregiver practice might predict caregivers' ability to use teaching strategies between EI sessions. Finally, it is worthwhile exploring whether coaching practices such as problem solving and reflection predict caregivers' ability to assume a greater leadership role during the intervention, a hypothesis put forth by adult learning theory (Bransford et al., 2000; Donovan, Bransford, & Pellegrino, 1999).

Limitations

Although the findings of this study demonstrated support for the SOOPR coaching process, it is important to interpret the findings considering the investigation's limitations. Some of the limitations of this study are inherent to the nature of secondary data analysis. The researcher had no control over the research design and implementation of the study. Consequently, some of the data caveats could not be addressed. One such caveat is data variability. There are two main ways of addressing data variability in SCD: (a) extending a phase until the data become stable, and (b) analyzing and reporting the sources of variability (Gast & Ledford, 2009; Kratochwill et al., 2010). It is possible that a longer intervention might have resulted in more stable data patterns throughout the intervention, maintenance, and generalization phases. Moreover, identifying the sources of variability throughout the implementation of the study would have allowed the researcher to control some of these variables. In addition, more studies are needed to evaluate if caregiver outcomes may be

maintained for longer than 5 weeks, and if caregivers can generalize the three development-promoting behaviors across a variety of routines and in contexts outside the home.

Another limitation of this study is that the data analysis method used was not a good fit for responding to the second research question. Graphing together the frequency of the independent and dependent variables yielded inconsistent patterns. An exhaustive coding scheme that captures the behaviors of the members of the triad (i.e., caregiver, child, and provider) and all the interactions that occurred throughout the sessions, would have allowed for use of sequential analysis to identify the association between the coaching strategies and caregiver initiations of development-promoting behaviors. Sequential analysis uses Yule's Q which is an appropriate index for comparing the strength of association between two behaviors because it is not influenced by the frequency of behavior sequences (Bakeman & Quera, 2011).

Implications

Implications for practice. This investigation generated several implications for practice and research. The findings of this study suggest that in order to build self-sufficient caregivers, it is critical that EI providers use the SOOPR coaching process to foster caregivers' ability to take the lead in EI sessions. Moreover, coaching caregivers to embed naturalistic teaching strategies into their preferred routines enables them to use development-promoting behaviors (teaching, responsiveness, and encouragement) associated with positive child outcomes. In-service and preservice preparation programs could use the SOOPR coaching framework to teach EI providers how to support caregivers to independently use development-promoting behaviors linked to positive child outcomes. Specifically, EI programs need to set explicit expectations for EI providers: that they should intentionally and gradually reduce their level of support as caregivers become familiar with interventions. In addition, to promote caregiver skill

generalization, providers need to support the caregivers to identify additional routines and settings that allow children to practice their learning targets. Of critical importance, as emphasized in adult learning literature, is to expand the activities that serve as contexts for intervention and include a variety of routines and settings that are relevant and meaningful for families to practice intervention strategies that foster child learning. This will promote skill internalization and foster a feeling of ownership, and caregivers will be better prepared to support their children's learning in the absence of EI providers.

Implications for future research. The findings of this study reveal that coaching supported caregivers' initiation of development-promoting behaviors both during the EI sessions and after the intervention was completed. Data also suggest a likely correspondence between the caregivers' use of strategies during EI sessions and their increased ability to use these behaviors in the absence of the provider as a result of the intervention. Future studies using a larger sample size should be designed to more rigorously determine the extent to which caregivers' initiations during EI sessions predict their ability to support their children's learning in the absence of EI providers. In addition, the impact of other variables (e.g., caregiver's education, cultural background, socio-economic status, and buy-in) on a caregiver's ability to confidently assume the lead in EI sessions is worthy of future investigation.

While the capacity-building paradigm suggests that caregivers' active participation in the process of learning is a key element in building caregivers' competence and confidence, little is known about the dosage of the coaching strategies that is required to support the caregivers to assume the lead in EI sessions. The results of this study showed that a large portion of the EI sessions was allocated to opportunities to practice and the frequency of specific coaching strategies decreased toward the end of the intervention. Future research should focus on

identifying which strategies (e.g., observing the caregiver, demonstration, or guided practice) and in which combinations play a more influential role in building caregivers' independence. For example, studies using a component analysis, sequential analysis, or correlation design could be used to isolate the coaching strategies that are salient for supporting the caregivers to assume the role as activity leaders in EI sessions. In addition, it is worthwhile exploring the circumstances under which, as well as when, providers should reduce their involvement in order to allow caregivers to have more "hands on" experience with their children. Such studies may assist providers and researchers in better understanding how to adjust their practices to build self-sufficient and effective caregivers.

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APPENDICES

APPENDIX A - PICCOLO OPERATIONAL DEFINITIONS

Domain	Item	Definition
Responsiveness	1. Pays attention to what child is doing.	Parent looks at and reacts to what child is doing by making comments, showing interest, helping, <i>or</i> otherwise attending to child's actions.
	2.Changes pace or activity to meet child's interests or needs.	Parent tries a new activity or speeds up or slows down an activity in response to where child looks, what child reaches for, what child says, or emotions child shows.
	3.Is flexible about child's change of activities or interests.	Parent accepts a child's choice of a new activity or toy <i>or</i> shows agreeableness about the change or about child playing in unusual ways with or without toys.
	4.Follows what child is trying to do.	Parent both responds to <i>and</i> gets involved with child's activities.
	5.Responds to child's emotions.	Parent reacts to child's positive or negative feelings by showing understanding or acceptance, suggesting a solution, reengaging the child, labeling or describing the feeling, showing a similar feeling, or providing sympathy for negative feelings.
	6.Looks at child when child talks or makes sounds.	When child makes sounds, parent clearly looks at child's face or (if eyes or child's face are not visible) parent's position and head movement face toward child.
	7. Replies to child's words or sounds.	Parent repeats what child says or sounds child makes, talks about what child says or could be saying, <i>or</i> answers child's questions.
Encouragement	1.Waits for child's response after making a	Parent pauses after saying something the child could do <i>and</i> waits for child to answer or do

	suggestion.	something, whether child actually responds or not.
	2.Encourages child to handle toys.	Parent offers toys or says positive things when child shows obvious interest in toys. (Does not include preventing children from mouthing toys.)
	3. Supports child in making choices.	Parent allows child to choose activity or toy <i>and</i> gets involved with activity or toy child chooses.
	4. Supports child in doing things on his or her own	Parent shows enthusiasm for things child tries to do without help, lets child choose how things are done, <i>and</i> lets child try to do things before offering help or suggestions. Parent can be engaged in activities child does "on his or her own."
	5. Verbally encourages child's efforts.	Parent shows verbal enthusiasm, offers positive comments, <i>or</i> makes suggestions about child's activity.
	6. Offers suggestions to help child.	Parent gives hints or makes comments to make things <i>easier</i> for child, without interfering with child's play.
	7.Shows enthusiasm about what child is doing.	Parent makes positive statements, claps hands, or shows other clear positive response to what child is <i>doing</i> , including quiet enthusiasm such as patting child, nodding, smiling, or asking child questions about activities.
Affection	1.Speaks in a warm ton of voice	Parent's voice is positive in tone and may show enthusiasm or tenderness. A parent who speaks little but very warmly should be coded highly.
	2. Smiles at child	Parent directs smiles toward child, but parent and child do not need to be looking at each other when smile occurs. Includes small smiles.
	3. Praises child	Parent says something positive about child characteristics or about what child is doing. A "thank you" can be coded as praise.
	4.Is physically close to child	Parent is within easy arm's reach of child, comfortably able to soothe or help. Con- sider context: Expect more closeness for book reading than for playing house.

	5. Uses positive expressions with child	Parent says positive things or uses words like "honey," "kiddo," or an affectionate nickname. (<i>Note:</i> Emphasis on verbal expressions.)
	6. Is engaged in interacting with child	Parent is actively involved together <i>with</i> child, not just with activities or with another adult.
	7. Shows emotional warmth	Parent shows enjoyment, fondness, or other positive emotion about child and directed to child. (<i>Note:</i> Includes verbal but emphasis on nonverbal.)

APPENDIX B: PICCOLO GENERAL CODING RULES FOR 3-min INTERVALS

- Only caregiver -child interactions will be coded in 3-min intervals.
- A 3-min interval can be coded as such if the provider interacts with the dyad for 15 sec. or less during that 3-min interval.
- Use your phone timer to keep the time for provider-caregiver-child interaction
- Use the video timer to keep the time for the 3-min interval.
- To determine the length of caregiver -provider interaction follow the steps listed below:
 1. Set your phone timer for 15 sec.
 2. Start watching the video. When you see the caregiver interacting with her child without provider interference, write down the video time. This is the “start time”.
 3. Continue watching the video.
 4. Whenever the provider interacts with the parent and/or the child, start the phone timer. Let the phone timer run while the provider interacts with the parent and/or the child.
 5. If the provider stops interacting with the caregiver and/or the child before the phone timer reaches 15 seconds, pause the phone timer. Continue watching the video.
 6. If the phone timer reaches 15 seconds before the video time reaches 3 minutes, this means it is a partial segment and we cannot use it. Repeat steps listed above until you identify a valid segment.
 7. If the video time reaches 3 minutes without the phone timer reaching 15 seconds, this means this 3-minute interval is valid to be coded. Go back to the start time, and code the interval using the PICCOLO definitions without coding the provider interactions. Pause at the end time, record the codes, reset your phone timer for 15 sec.

Example 1: Let's say that the parent-child interaction starts at 3:25. At this time, you set your phone timer for 15 sec, and start watching the video. The provider chats on and off with the parent and/or the child. You start the phone timer every time you see the provider interacting with the parent and/or the child. You pause the timer each time the provider stops interacting with the parent and/or child. The video time reaches 6:25 and phone timer is at 13 seconds. This means this segment is valid. You go back to 3:25 and code all GC-child interactions. You do not code the provider interactions. At 6:25 you pause the video, record the codes for this segment.

Example 2: Let's say that the parent-child interaction starts at 3:25. At this time, you set your phone timer for 15 sec, and start watching the video. The provider chats on and off with the parent and/or the child. You start the phone timer every time you see the provider interacting with the parent and/or the child. You pause the timer each time the provider stops interacting with the parent and/or child. At the minute 5:48 the phone timer reaches 15 seconds. This means we need to discard this segment and start from the beginning.

APPENDIX C: HOW STRATEGIES – TIP SHEET - EPIC

HOW intervention strategies for the EPIC intervention belong to one of four general categories. These strategies should be applied in diverse routines and they may be individualized for the child and family. The intervention strategies are adaptable for motor and communication targets. As caregivers master the HOW strategies, they learn to support their child's development across the day, every day.

Environmental Arrangement: EA is a strategy used to create opportunities for the child to practice their WHAT target. EA practices include the following strategies

1. Positioning the partners in a way to maximize the child's participation (child is face to face, sitting with support, etc.)
2. Arranging the materials to promote engagement and participation (i.e., shaking rattle on the child's opposite side to encourage a reach across midline)
3. Giving the child objects that require adult help (i.e., container of cheerios with a lid so the child needs help to open) = Assistance needed
4. Placing objects out of reach so child has to move or communicate to obtain them = In sight but out of reach
5. Giving small amounts of a desired objects so that the child needs to request or move to get more = Small portions

Contingent Responding: Contingent responding is when the caregiver notices, responds, models, and expands the child's use of target skills.

1. Balanced turn-taking: The caregiver takes one verbal or nonverbal turn at a time during interactions with the child (i.e., child rolls the ball, caregiver rolls it back; child vocalizes and the caregiver responds, then pauses for the child's next turn)
2. Contingent imitation: The caregiver imitates the child's communication or motor act (i.e., if the child bangs two blocks, the caregiver bangs two blocks, if the child claps, the caregiver claps)
3. Expansions: Caregiver repeats/responds to the child's word/gesture/sign by adding a word or modeling an expanded form of communication based on the child's utterance (i.e., child points, caregiver points and says, "truck", child says "more" and the caregiver responds "more juice")
4. Modeling: Caregiver provides a model of the child's communication or motor target.

Wait time: Caregiver pauses and looks expectantly at child, providing a nonverbal cue for the child to perform the target behavior, and then waits for up to 5 seconds for the child to perform the skill. Waiting gives the child time to attempt the target independently before the caregiver uses another strategy to add increased support.

A caregiver stands up and looks down at child, waiting expectantly for child to gesture "up"; a caregiver holds cup in front of child and waits for child to bring hands together to hold cup; a

caregiver holds up two items and waits for child to choose one.

Prompting: Caregiver uses intentional prompts following a sequence (least to most or most to least support) to encourage the child to engage in target behavior

Least to Most Prompting Sequence: Communication: Open-ended question>Choice Prompt
>Direct Prompt e.g., "What do you want? > Do you want milk or juice >Say "milk"

Prompting for motor skills looks a little different

Motor skills: Task direction > Partial Support > Full support e.g., "Get those legs over" >helps child move legs to one side> rotates hips over so that the child rolls

APPENDIX D: COACHING FIDELITY CHECKLIST**S-O-O-P-R Coaching Practices****Provider:****Session Date:****Rater:****Rating Date:**

Use this checklist to document use of the S-O-O-P-R components in video recorded home visits. These indicators are observable practices that you may see in EPIC home visit sessions. Check “Yes” for each of the practices observed, note the time interval, and write a brief description of the practice (e.g., *Provider asked mom what she thought went well during hand washing*). Check “No” if the practice was not observed during the video.

Observable Coaching Practice	Yes	Video Time	Description of Observed Practice in Video	No
Setting the Stage				
1. Provider gathers status update with caregiver about child or family (e.g. recent activities, general info, health)				
2. Provider and caregiver discuss what happened with intervention implementation since last visit (using the visual model is optional).				
3. Provider and caregiver review how specific child targets, strategies, or routines/activities connect to larger goals or IFSP outcomes				
4. Provider and caregiver discuss plans to embed specific target(s) (what), using which teaching strategy(ies) (how), in which routine or activity (when/ where) during the visit.				
Observation				
5. Provider reminds caregiver that in order to build on strengths and identify opportunities for embedding instruction, she/he will observe caregiver and child in routine(s).				

Observable Coaching Practice	Yes	Video Time	Description of Observed Practice in Video	No
6. Provider observes caregiver and child interaction during specified routine or activity before initiating specific coaching strategies to teach child targets or coach the caregiver on “how” strategies				
Opportunities for Embedding Intervention				
7. Provider uses the specific coaching strategies at least 3 times in each of 2 or more routines or activities to support caregiver's interactions with or teaching of the child				
Indicators:				
a. <u>Direct teaching</u> . Provider shares specific information about an intervention strategy, child development, or a routine/activity with the caregiver				
b. <u>Demonstration with narration</u> . Provider demonstrates how to teach for caregiver by interacting with the child and commenting about the teaching strategies being used				
c. <u>Guided practice with caregiver</u> . Provider either is engaged with the caregiver or child or sitting closely with the dyad <u>and</u> provides specific suggestions or directions to the caregiver on the target, strategy use, or routine/activity				
d. <u>Caregiver practice</u> . Provider observes caregiver implementing at least one teaching strategy with child on the identified learning target				
8. Provider gives specific feedback immediately (within 30 seconds) after occurrence at least 3 times following guided practice or caregiver practice (CG) interaction (e.g., “when you put your hands at his waist, he straighted right up in his chair).				
9.. Provider gives general feedback at least 3 times during the session (e.g., “that looked like fun”) or encouragement (e.g., “he’s getting it!”)				

Observable Coaching Practice	Yes	Video Time	Description of Observed Practice in Video	No
Reflection and Problem Solving				
10. Either provider <u>or</u> caregiver initiates an exchange of ideas or information relevant to the activity/routine, the learning target, or the intervention strategy for at least 2 turns to clarify, expand, or revise caregiver actions				
11. Provider helps caregiver reflect on or about the success of the routine OR home visit to determine if additional adjustments/supports might be needed [visual model should be used to guide discussion]				
Review				
12. Provider and caregiver identify ways the parent can evaluate child progress between current and next planned visit) (e.g., number of steps taken, which words used in context duration, frequency, or type of behavior observed)				
13. Provider and caregiver jointly review the visual model and revise as needed.				

APPENDIX E: CAREGIVER FEEDBACK SURVEY – EPIC

Caregiver Feedback Survey

Date completed (mm/dd/yyyy): _____ Family/Child: _____ Site: _____

Thank you for agreeing to participate in the Embedded Practices and Intervention with Caregivers (EPIC) Project. Family input is essential to this project and the information you share will be used to revise the process for future studies. Please complete this survey before you participate in your interview. We will use your answers to help guide our discussion.

Everyday Routines and Activities	Very useful	Somewhat useful	Not very useful	Not at all useful		
1. The EPIC approach uses everyday routines and activities, and the family's own toys and materials, for teaching and learning. To what extent do you think this is a useful approach?						
Coaching	Very useful	Somewhat useful	Not very useful	Not at all useful		
2. Rather than working directly with your child, the EPIC approach uses coaching as a primary means of working with you. To what extent do you think coaching was useful to support your learning of how to teach your child?						
What coaching strategies did your provider do that helped you learn? (check all that apply) <table border="0" style="width: 100%;"> <tr> <td style="vertical-align: top;"> <input type="checkbox"/> Share specific information about intervention strategies/child development <input type="checkbox"/> Demonstrate and explain intervention strategies <input type="checkbox"/> Make suggestions about things to try <input type="checkbox"/> Practice with you <input type="checkbox"/> Give you opportunities to practice </td> <td style="vertical-align: top;"> <input type="checkbox"/> Ask questions <input type="checkbox"/> Answer your questions <input type="checkbox"/> Problem solve with you <input type="checkbox"/> Share handouts/materials <input type="checkbox"/> Other (please describe) _____ </td> </tr> </table>					<input type="checkbox"/> Share specific information about intervention strategies/child development <input type="checkbox"/> Demonstrate and explain intervention strategies <input type="checkbox"/> Make suggestions about things to try <input type="checkbox"/> Practice with you <input type="checkbox"/> Give you opportunities to practice	<input type="checkbox"/> Ask questions <input type="checkbox"/> Answer your questions <input type="checkbox"/> Problem solve with you <input type="checkbox"/> Share handouts/materials <input type="checkbox"/> Other (please describe) _____
<input type="checkbox"/> Share specific information about intervention strategies/child development <input type="checkbox"/> Demonstrate and explain intervention strategies <input type="checkbox"/> Make suggestions about things to try <input type="checkbox"/> Practice with you <input type="checkbox"/> Give you opportunities to practice	<input type="checkbox"/> Ask questions <input type="checkbox"/> Answer your questions <input type="checkbox"/> Problem solve with you <input type="checkbox"/> Share handouts/materials <input type="checkbox"/> Other (please describe) _____					
5Q	Very useful	Somewhat useful	Not very useful	Not at all useful		
3. You and your provider discussed 5 questions in relation to embedding learning opportunities for your child in family routines (Why? What? Where/When/Who? How? and Is it working?). To what extent did you find the 5 questions are useful in learning the steps for how to embed learning targets in everyday routines?						

4. To what extent was the 5Q visual model useful in actually teaching your child motor and communication skills between home visits?				
EPIC Approach	Very useful	Somewhat useful	Not very useful	Not at all
5. The EPIC approach starts off with frequent home visits for 1 to 2 weeks, and then reduces the number of visits as caregivers learn the 5Q process. This is called “front loading” coaching with caregivers. To what extent did you find this “front loaded” process useful in first learning how to work with your child?				
6. The EPIC approach asks EI providers to follow a general, but flexible, sequence during home visits. To what extent was the flow of the home visit useful in helping you identify and use naturally occurring learning opportunities as teachable moments with your child?				
Using Intervention Strategies	Never	Sometimes but not everyday	Everyday	Multiple times during the day
7. Outside of EPIC home visits, how often did you use intervention strategies in the routines you identified and practiced with your EPIC provider?				
8. How often did you use intervention strategies in OTHER routines or activities with your child?				
Self Efficacy	A great deal	Somewhat	Not	Not at all
9. To what extent do you think the EPIC approach helped you take a more active role in your child's learning?				
10. To what extent do you agree with the following statement? “Now that I know how to use 5Q, I feel more confident and able to teach my child essential skills”.				

Other comments you would like to share:

APPENDIX F: DATA ANALYSES TABLES FROM GAST & LEDFORD, 2014

Dyad 1																
Within Condition Analysis																
	Teaching				Responsiveness				Encouragement				Affection			
Condition	B	I	M	G	B	I	M	G	B	I	M	G	B	I	M	G
Level																
Median	0.46	1.42	2.78	4.2	0.52	0.94	0.96	0.79	0.4	0.79	0.73	0.43	0.86	0.86	0.94	0.86
Mean	0.44	1.52	2.82	3.49	0.51	0.93	0.94	0.81	0.39	0.78	0.76	0.52	0.85	0.88	0.91	0.83
Range	0.39-0.46	1.08-2.75	2.5-3.13	1.5-5.26	0.46-0.55	0.83-1	0.82-1	0.57-1	0.32-0.45	0.51-0.94	0.68-0.89	0.14-0.86	0.81-0.89	0.8-1	0.82-0.96	0.71-0.86
Stability Envelope	0.12	0.12	0.12	0.12	0.13	0.13	0.13	0.13	0.1	0.1	0.1	0.1	0.22	0.22	0.22	0.22
Level Change																
Relative Change	0.00	0.07	-0.12	0.84	0.03	0.07	-0.11	0.04	-0.05	0.18	0.06	0.15	0.05	0.09	-0.1	-0.08
Absolute Change	0	0.25	-0.05	-1.06	0.03	0.17	-0.18	0	-0.05	0.06	0.08	0	0.05	0.11	-0.13	-0.15
Between Conditions – Baseline to Intervention																
Trend																
Slope	0	0.01	-0.04	0.28	0.02	0.01	-0.04	0.01	-0.02	0.03	0.02	0.05	0.02	0.01	-0.03	-0.03
Stability	1	0.38	0	0	1	1	1	0.4	0.67	0.69	0.8	0	1	1	1	1
Change in Level																
Relative Change	0.92, improvement				0.33, improvement				0.30, improvement				-0.02 deteriorating			
Absolute Change	1.41-0.46		0.95, improvement		0.83-0.55		0.28, improvement		0.71-0.40		0.31, improvement		0.83-0.86		-0.03	
Median Change	1.42-0.46		+0.96 improvement		0.94-0.52		+0.42, improvement		0.79-0.4		+0.39 Improvement		0.86-0.86		0, No change	
Mean Change	1.52-0.44		+1.08 improvement		0.93-0.51		+0.42 Improvement		0.78-0.39		+0.39 Improvement		0.88-0.85		+0.03 Improvement	
PND	100%				100%				100%				38%			

Note: B= baseline, I= intervention, M= maintenance, G = generalization

Dyad 2																
Within Condition Analysis																
	Teaching				Responsiveness				Encouragement				Affection			
Condition	B	I	M	G	B	I	M	G	B	I	M	G	B	I	M	G
Level																
Median	0.29	1.26	2.54	4	0.34	1	0.95	0.86	0.11	0.82	0.71	0.57	0.33	0.79	0.79	0.86
Mean	0.28	1.32	2.85	3.92	0.35	0.96	0.93	0.83	0.12	0.78	0.73	0.57	0.34	0.78	0.76	0.77
Range	0.15-0.37	0.7-2.28	1.89-4.33	3.51-4.33	0.21-0.52	0.79-1	0.86-1	0.57-1	0-0.21	0.64-0.89	0.62-0.81	0.29-0.86	0.18-0.54	0.71-0.86	0.67-0.82	0.57-0.86
Stability Envelope	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.03	0.03	0.03	0.03	0.08	0.08	0.08	0.08
Level Change																
Relative Change	-0.15	0.47	-1.69	-0.28	0.01	0.04	0.04	0.21	0.07	0.15	0.03	0.29	0.18	-0.08	-0.02	-0.07
Absolute Change	-0.05	1	-1.79	-0.82	-0.21	0.04	0.03	0	0.14	0.07	0.17	0.29	0.2	0.07	0.01	-0.29
Between Conditions – Baseline to Intervention																
Trend																
Slope	-0.03	0.09	-0.56	-0.09	0	0.01	0.01	0.07	0.01	0.03	0.1	0.1	0.04	-0.02	-0.01	-0.02
Stability	0.8	0.2	0.2	0	0.3	0.9	1	0.2	0.4	0.3	0.4	0.2	0.5	0.7	0.8	0.4
Change in Level																
Relative Change	0.36, improvement				0.62, improvement				0.57, improvement				0.97, improvement			
Absolute Change	1.28-0.30		0.98, improvement		0.96-0.24		0.72		0.82-0.19		0.63, improvement		0.75-0.38		0.37, improvement	
Median Change	1.26-0.29		+0.97, improvement		1-0.34		+0.66, improvement		0.82-0.11		+0.71, improvement		0.79-0.33		+0.46, improvement	
Mean Change	1.32-0.28		+1.04, improvement		0.96-0.35		+0.61, improvement		0.78-0.12		+0.66, improvement		0.78-0.34		+0.44, improvement	
PND	100%				100%				100%				100%			

Note: B= baseline, I= intervention, M= maintenance, G = generalization

Dyad 3																
Within Condition Analysis																
	Teaching				Responsiveness				Encouragement				Affection			
Condition	B	I	M	G	B	I	M	G	B	I	M	G	B	I	M	G
Level																
Median	0.27	1.21	3.94	3.51	0.57	0.96	0.86	1	0.29	0.79	0.81	0.71	0.75	0.86	0.81	0.86
Mean	0.27	1.25	3.96	3.47	0.53	0.92	0.85	0.91	0.3	0.74	0.79	0.77	0.75	0.83	0.79	0.83
Range	0.18-0.41	0.85-1.74	3.76-4.27	2.2-4.3	0.43-0.6	0.69-1	0.71-0.93	0.71-1	0.11-0.48	0.5-0.86	0.64-0.93	0.71-0.86	0.64-0.8	0.71-1	0.71-0.86	0.71-1
Stability Envelope	0.07	0.07	0.07	0.07	0.14	0.14	0.14	0.14	0.07	0.07	0.07	0.07	0.19	0.19	0.19	0.19
Level Change																
Relative Change	0	0.07	-0.19	0.24	0.05	-0.09	0.11	0.07	-0.02	0.01	0.22	-0.07	0.02	-0.04	0.12	0.07
Absolute Change	-0.02	0.15	0.12	-0.49	0.11	-0.14	0.15	0.15	-0.18	-0.15	0.22	0	0.07	-0.07	0.1	0.29
Between Conditions – Baseline to Intervention																
Trend																
Slope	0	0.01	-0.06	0.08	0.01	-0.02	0.04	0.02	0	0	0.07	-0.02	0	-0.01	0.04	0.02
Stability	0.85	0.22	0	0	1	0.89	1	1	0.62	0.33	1	0.4	1	1	1	1
Change in Level																
Relative Change	1.34, improvement				0.43, improvement				0.49, improvement				0.11, improvement			
Absolute Change	1.59-0.25		0.92, improvement		1-0.54		0.46		0.86-0.11		0.75, improvement		0.86-0.71		0.15, improvement	
Median Change	1.21-0.27		+0.94, improvement		0.96-0.57		+0.39, improvement		0.79-0.29		+0.50, improvement		0.86-0.75		+0.11, improvement	
Mean Change	1.25-.27		+0.98, improvement		0.92-0.53		+0.39, improvement		0.74-0.3		+0.44, improvement		0.83-0.75		+0.08, improvement	
PND	100%				100%				100%				56%			

Note: B= baseline, I= intervention, M= maintenance, G = generalization

Dyad 4																
Within Condition Analysis																
	Teaching				Responsiveness				Encouragement				Affection			
Condition	B	I	M	G	B	I	M	G	B	I	M	G	B	I	M	G
Level																
Median	0.27	1.01	1.97	1.83	0.43	0.95	0.86	0.71	0.29	0.86	0.71	0.71	0.86	0.9	0.86	0.86
Mean	0.26	1.06	1.89	2.42	0.41	0.93	0.82	0.77	0.27	0.84	0.68	0.68	0.86	0.89	0.85	
Range	0.18-0.35	0.85-1.31	0.95-2.7	1.7-3.45	0.32-0.48	0.86-1	0.64-0.93	0.57-1	0.2-0.38	0.72-0.9	0.36-0.93	0.57-0.86	0.76-0.95	0.79-1	0.71-0.93	0.71-1
Stability Envelope	0.22	0.22	0.22	0.22	0.11	0.11	0.11	0.11	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Level Change																
Relative Change	0.01	0.33	0.97	0.84	0.1	0.12	0.06	-0.22	0.08	-0.06	0.04	0.21	-0.04	0	-0.1	0
Absolute Change	-0.09	0.46	1.39	0.05	0.05	0.12	0.12	0	0.09	-0.06	0.31	0.14	-0.18	-0.09	-0.12	0
Between Conditions – Baseline to Intervention																
Trend																
Slope	0	0.08	0.32	0.28	0.03	0.03	0.02	-0.07	0.03	-0.01	0.01	0.07	-0.01	0	-0.03	0
Stability	0.8	1	0.2	0	1	1	0.4	0.2	0.8	0.86	0.6	0.6	1	1	1	1
Change in Level																
Relative Change	0.67, improvement				0.38, improvement				0.57, improvement				0.24, improvement			
Absolute Change	0.85-0.18		0.67, improvement		0.85-0.47		0.38, improvement		0.86-0.29		0.57, improvement		1-0.76		0.24, improvement	
Median Change	1.01-0.27		+0.74, improvement		0.95-0.43		+0.52, improvement		0.86-0.29		+0.57, improvement		0.9-0.86		+0.04, improvement	
Mean Change	1.06-0.26		+0.8, improvement		0.93-0.41		+0.52, improvement		0.84-0.27		+0.57, improvement		0.89-0.86		+0.03, improvement	
PND	100%				100%				100%				14%			

Note: B= baseline, I= intervention, M= maintenance, G = generalization

APPENDIX G – IRB APPROVAL NOTICE



STARTS APPROVAL EXPIRES

Child & Family Development Center (M/C 628)
 College of Education
 1640 West Roosevelt Road, Room 336
 Chicago, Illinois 60608

SEP 19 2014 TO SEP 19 2015

UNIVERSITY OF ILLINOIS AT CHICAGO
 INSTITUTIONAL REVIEW BOARD

University of Illinois at Chicago Child & Family Development Center
EMBEDDED PRACTICES AND INTERVENTION WITH CAREGIVERS PROJECT
PARENT
CONSENT
YEAR 2 STUDY

CFDC is participating in a national study to improve the quality of early intervention (EI) practices with children and families called the Embedded Practices and Intervention with Caregivers Project (EPIC). EPIC was funded to develop, refine, and evaluate a triadic coaching approach to improve the consistency with which parents and caregivers promote their children's learning in natural environments, and enhance outcomes for infants/toddlers with significant disabilities who receive home-based, early intervention (EI) (birth to age 3) services.

The EPIC intervention is designed around a series of five questions (we refer to it as the 5Q process). The concept is that by asking and answering these five questions, parents/caregivers will better understand and learn strategies for embedding important learning opportunities for their child into activities and routines that occur throughout their day. These five questions relate to who teaches, when and where teaching occurs, what is taught and why, how teaching occurs, and how to evaluate the results of the teaching experience. A feature that distinguishes the EPIC approach from typical EI home visiting is that EPIC will include more frequent home visits during the initial phase to help parents/caregivers more quickly learn to implement 5Q embedded instruction.

We are inviting you to participate in a short study because you have a child enrolled at CFDC who meets the criteria for this study. One of our Project staff members will explain to you, in detail, the purpose of this study, the procedures to be used, potential benefits or risks of participation, and compensation for your participation. If you then decide that you and your child wish to participate in this study, please sign this form on the line below. We will give you a copy of this letter to keep.

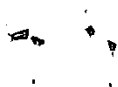
Nature and purpose of the project: The purpose of this study is to examine how what parents and providers do using the EPIC 5-Q approach and coaching impacts the child's ability to learn motor and communication skills. The EI providers will coach you on how to use strategies that are easy to include in your family's typical routines and activities

throughout the day. You and your child will participate in this home-based study for approximately 6-9 weeks.

Explanation of Procedures: You and your child will be asked to participate in a variety of procedures and practices that are common to EI, as well as some that you may not have participated in previously as part of this project. The total time commitment is estimated to be approximately one extra hour per week for 6-9 weeks beyond the regularly scheduled EI home visit(s) for your child. The activities we will do are as follows: First, standard educational assessments will be conducted with your child to verify his/her abilities prior to final enrollment in the study. Next, you and your child will participate in two to three 60 minute home visits with an EPIC coach each week to learn to embed intervention into your preferred routines and activities. Activities may include storybook reading, eating, dressing, playing with toys, or bathing. We will videotape your EI sessions to help us score the behaviors and strategies that are used in these sessions accurately. We will repeat the assessment measures with your child and ask you to complete brief survey measures at the end of the study.

Discomforts and Risks: All of the routines and activities that will occur in your home with you and your child are ones that you would typically engage in and have identified for intervention. The instructional strategies that we will teach you will help you embed teaching into your everyday activities and routines and are also ones commonly used with infants and toddlers in EI. Because of this, we do not believe that there are any activities that would cause discomfort to your child or put your child at any risk. However, if you or your child should become concerned for any reason, the videotaping or instruction will be stopped, and rescheduled with your permission. While we believe risks to you are minimal if you participate in the EPIC Project, there may be some activities that could concern you. For example, if others find out that you are participating in the EPIC project you might feel you have lost some privacy. There is also some risk that others could discover identifiable information about you during data collection. We take many precautions to protect your privacy and confidentiality and believe that that there is a very low risk of this happening.

You will be asked as part of the EPIC research to (1) have more frequent videotaping done, (2) learn a specific teaching process to help your child learn (5Q), and (3) complete a feedback form to let us know what you think about the approach we are developing. The more frequent videotaping may feel intrusive, though most parents tend to "tune it out" over time. The 5Q process may initially seem too structured or difficult to you. We will help you address these concerns by having your EI provider "coach" you so you become comfortable and good at using the process. We hope, with your assistance, to modify the process so that parents such as you do, in fact, think it is helpful and feasible. Finally, giving feedback to the project might raise concerns for you about whether your opinions could potentially influence services your child receives. We can assure you your child will continue to receive EI services regardless of your feedback or participation in EPIC, and your relationship with the program will not be harmed by your honesty.



Benefits: You and your child may benefit from involvement in this study because the frequency of initial home visits and our 5Q process for teaching parents how to embed instruction is more focused than typical EI services. There are at least two other ways we believe will benefit you/your child. First, we will provide you with information about your child's development. Your child will have opportunities to learn new skills through interacting with you. You will learn new strategies (the 5Q process) to use to support your child's learning in the everyday activities that you already do. Second, the results of this study will help with the early intervention practices used for children with significant delays. This information should lead to more appropriate services to young children and their families as we are able to show local agencies and providers how effective this approach is.

Confidentiality: All records relating to this study will remain confidential and will be handled and safeguarded according to university policies. The UIC IRB and State of Illinois auditors may review identifiable information in order to ensure that the research is conducted appropriately. Videotapes and audio recordings that are used for data coding and analysis will be kept in a locked office at CFDC. The videotapes will be coded as little bits of behavior in small time intervals and entered into a computer for analysis. No names will be used when we enter the coded information so your identities will be protected. All videotapes will be maintained for a minimum of 7 years or until June, 2020 and then destroyed, unless you have provided specific permission to us to use tape segments for training graduate students and EI providers. We will make up a code number for your child to protect your child's and your identity. Numbers and codes will be used to analyze the information we collect. We will blend your information together with information gathered from other children/families when writing our reports. Combining your child's information and your survey information with other children/parents will help protect your identity.

Refusal/Withdrawal: At any time during your participation in this study, you will have the opportunity to refuse to participate in any procedures or withdraw from the study at any time without affecting your child's services or your relationship with CFDC.

Compensation: When you have completed the feedback measures and finished the 6-9 weeks of videotaped sessions, you will receive a \$100.00 gift card. If you decide to drop out before the study is complete, then we cannot give you a gift card. It is important that you know the University requires that any person receiving \$100 or more in a year provide their social security number so that the accounting department can send you a statement at the end of the year. We will ask you to give us your number so we can pay you for your participation.

Your participation is voluntary and no one will be upset if you decide not to participate, or if you change your mind and want to stop at a later date. You can "opt out" of participating in the EPIC project by contacting me at (312) 413-1563 or Antonela Ciupe, the site coordinator for the project, at (312) 413-1389.



However, we certainly hope you will agree to participate. We need parent input and cooperation so that we can develop the EPIC approach and evaluate its usefulness with caregivers and children. You can ask any questions now that you might have about the project, or if you have a question later that you didn't think of, you can call me or send me an email: csalis1@uic.edu.

If you have any questions about your rights as a participant in this project, you may call the Office for Protection of Research Subjects at (312-996-1711 or 866-789-6215), or email them (uicirb@uic.edu).

Thank You!

I ACKNOWLEDGE THAT I HAVE READ AND FULLY UNDERSTAND THE ABOVE EXPLANATION OF THIS STUDY, ALL OF MY QUESTIONS HAVE BEEN SATISFACTORILY ANSWERED, AND I AGREE TO PARTICIPATE WITH MY CHILD.

My child's name is: _____

Signature of Parent/Caregiver

Date

I CERTIFY THAT I HAVE EXPLAINED FULLY TO THE PERSON ABOVE THE NATURE AND PURPOSE, PROCEDURES, POSSIBLE RISKS AND POTENTIAL BENEFITS, AND COMPENSATION RELATED TO THIS STUDY.

Signature of Co-PI or Designee

Date

UIC
(312) 413-1567



Child & Family Development Center (M/C 628)
College of Education
1640 West Roosevelt Road, Room 336
Chicago, Illinois 60608

STARTS APPROVAL EXPIRES

SEP 19 2014 TO SEP 19 2015

PROVIDER RECRUITMENT SCRIPT – YEARS 1-2

UNIVERSITY OF ILLINOIS AT CHICAGO
INSTITUTIONAL REVIEW BOARD

Good morning/afternoon,

The reason for speaking with you today is to invite you to participate in a project we are doing at CFDC. We have received funding from the U.S. Department of Education to develop a new approach to working with caregivers and their infants/toddlers with more significant disabilities at home. The project is called *“Embedded Practices and Intervention with Caregivers”* (EPIC). Its aim is to design, develop, and evaluate a functional approach to triadic intervention that results in improved provider coaching skills and caregivers who are more capable of embedding interventions in everyday routines/activities. There are some unique and exciting features of the EPIC approach and we would like your help with this important project if you are interested.

Briefly, EPIC has two components --- enhanced coaching and a 5 question process (called 5Q) that is designed to help caregivers promote their child's learning by embedding teaching learning throughout the day within everyday activities and routines. The 5-Q process relates to who teaches, when and where teaching occurs, what is taught and why, how teaching occurs, and how to evaluate the results of the teaching experience.

Through the project, EI providers will receive on-line and face-to-face professional development to enhance their coaching skills. We will also be developing on-line video and teaching resources that will give both providers and caregivers video examples and important information about embedded intervention. We will be videotaping the child's EI sessions and will be asking you to help us evaluate the approach by completing an occasional survey and implementation checklists. Unlike typical weekly EI sessions, EPIC starts with 3 times/week sessions to help parents learn to embed teaching within everyday activities and routines more quickly. Then the frequency of visits is gradually reduced to one time per week as they learn how to use the 5Q teaching process. Participation will vary from one to three months, depending upon the study you become involved in. Because you are a UIC employee, you cannot receive an honorarium for your participation. You will be reimbursed for your home visit mileage/costs as you are now. Your participation is voluntary and provisions are made in our data collection process to protect your privacy and confidentiality.

Do you think you'd be interested in participating? Are there other questions I can answer at this time? If you are interested, I will schedule a time to meet with you to walk through the informed consent document and get your consent. The consent document gives additional details about your participation. I will answer other questions you might have at that time.



*Child & Family Development Center (M/C 628)
College of Education
1640 West Roosevelt Road, Room 336
Chicago, Illinois 60608*

STARTS APPROVAL EXPIRES

SEP 19 2014 TO SEP 19 2015

PARENT RECRUITMENT SCRIPT

UNIVERSITY OF ILLINOIS AT CHICAGO
INSTITUTIONAL REVIEW BOARD

Good morning/afternoon/evening,

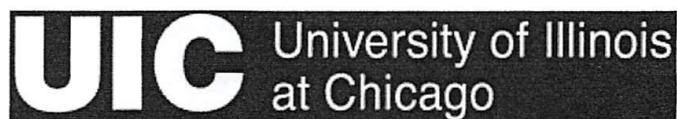
My name is _____ and I am with the Child & Family Development Center at UIC. The reason for [my call/meeting with you] today is to invite you to participate in a project we are doing at CFDC. We have received funding from the U.S. Department of Education to develop a new approach to working with caregivers and their infants/toddlers with more significant disabilities at home. The project is called "*Embedded Practices and Intervention with Caregivers*" (EPIC). It is similar to what we do now where the provider coaches the caregiver and works with the child. However, there are some unique and exciting features of the EPIC approach that we are developing. We would like your help with this important project.

Briefly, EPIC has two components --- enhanced caregiver coaching and a 5 question process (called 5Q) that is designed to help caregivers promote their child's learning by embedding teaching learning throughout the day within everyday activities and routines. The 5-Q process relate to who teaches, when and where teaching occurs, what is taught and why, how teaching occurs, and how to evaluate the results of the teaching experience. **Your participation will occur within the context of scheduled EI home visit sessions.**

We will be developing on-line video and teaching resources that provide parents with video examples and important information about embedded intervention. We will be videotaping your child's EI sessions and will be asking you to help us evaluate the approach by completing an occasional survey. Unlike typical weekly EI sessions, EPIC starts with 3 times/week sessions to help parents learn to embed teaching within everyday activities and routines more quickly. Then the frequency of visits is gradually reduced to one time per week as you learn how to use the 5Q teaching process. Participation will vary from one to three months, depending upon the study you become involved in. You will receive \$100 for completing the activities in each study.

Your participation is voluntary and saying "no" will not affect your child's services at CFDC. Do you think you'd be interested in helping us on this project? Are there other questions I can answer at this time? If you are interested, I will give you more detailed information when we meet. At that time I will ask you to sign a permission/consent form and can answer other questions you might have.

Thank you for talking with me. I'm looking forward to meeting with you!



Child & Family Development Center (M/C 628)
 College of Education
 1640 West Roosevelt Road, Room 336
 Chicago, Illinois 60608

STARTS APPROVAL EXPIRES
 SEP 19 2014 TO SEP 19 2015

UNIVERSITY OF ILLINOIS AT CHICAGO
 INSTITUTIONAL REVIEW BOARD

University of Illinois at Chicago
Provider Consent Form
Embedded Practices and Intervention with Caregivers- Yrs 1 & 2

What you are being asked to do?

You are being invited to participate in one of two studies that are being undertaken as part of a federally funded project called "***Embedded Practices and Intervention with Caregivers***" (EPIC). EPIC was funded to develop, refine, and evaluate a triadic coaching approach to improve the consistency with which caregivers promote their child's learning in natural environments, and enhance outcomes for infants/toddlers with moderate and severe disabilities who receive home-based, EI services.

The EPIC intervention is framed as a process that invokes a series of questions (i.e., 5 questions or 5Q) so caregivers understand and learn strategies for embedding learning opportunities related to who teaches, when and where teaching occurs, what is taught and why, how teaching occurs, and how to evaluate teaching. The EPIC intervention has two primary components: (a) a triadic coaching framework to support caregiver learning, and (b) an embedded learning opportunities instructional protocol to support caregivers' use of 5Q and a visual model as they provide learning opportunities for their child in routines and activities. A feature of EPIC includes increased home visits during the initial phase for caregivers learning to implement 5Q embedded instruction.

What procedures are involved?

1. You will be invited to participate in either the Year 1 try-out study or the Year 2 single subject study.
2. You will receive face-to-face and web-based training and support from the project to ensure that you can implement the EPIC coaching strategies and process with fidelity.
3. You will be asked to complete several types of measures: 1) demographic form; 2) a social validity scale to provide us feedback about the design, utility, and feasibility of the EPIC approach; and 3) a caregiver implementation (fidelity of

implementation) checklist.

4. All home visit sessions will be videotaped so that we can independently code what occurs during these intervention and teaching sessions. A videographer will accompany you on home visits so that you can focus on working with the child and the caregiver.
5. The site coordinator (Antoneia Ciupe) or a Spanish-speaking doctoral student (Elizabeth Cambray-Engstrom) will conduct all project specific child assessments.
6. A feature of EPIC includes increased home visits during the initial phase for caregivers to learn to implement 5Q embedded instruction. Therefore, our coaching procedures will involve initially more frequent home (3 times/week) visits by providers, with frequency faded to weekly as caregivers become successful in using the 5-Q process within routines and activities.
7. In Year 1, a small try-out study will be conducted to evaluate the feasibility of the EPIC coaching component and the 5Q embedded teaching process. If you participate in the try-out study, you will be asked to work with 2 children and their caregivers for one month.
8. In Year 2, we will conduct a series of single subject studies to evaluate how the coaching component and 5Q process are related to child learning outcomes in the areas of communication and motor. If you participate in the Year 2 study, you will be asked to use the coaching strategies to teach 2 caregivers/children over a 6-9 week period.
9. Some of your time will be paid for by the project so that the costs for EI sessions exceeding those authorized by IL DHS can be returned to CFDC. Parking and travel expenses related to home visits and training will be paid for by the grant. If you are a university employee, you are not allowed to receive additional compensation for your participation in EPIC activities. If you are not a university employee, you will receive \$100 for completing all of the study activities, in addition to the payment you receive from the insurance carrier or DHS for providing direct services to the child/family. The university will require that we obtain your social security number so that the accounting department can send you a 1099 tax form.

What are the potential risks and discomforts?

We are obligated to share with you what might be considered discomforts or risks related to your participation in this project. You may worry that declining to participate in the research will affect your job status or that, if you do participate, the evaluations of the research data will affect your overall job evaluation. You may also be concerned about the confidentiality of information we would collect about the services you deliver to children and families or you may feel uneasy about being videotaped by project staff during EI sessions. Remember, the videotaping is not designed to evaluate your services, but rather to describe what the structure and nature of those services are for children and families and how coaching practices are enacted. Any information about your intervention practices, or your work of children and families in your care will remain strictly confidential. No information will be collected about your services or the

families and children with whom you work until you and the parents have provided informed consent. A number will be used instead of your name on all summaries that we develop to describe the services that you provided. The information we gather about your work will be blended with that of other early interventionists to prepare a summary evaluation of EPIC findings. It will not be possible for others to identify you or the children and families with whom you work through the information shared in professional forums.

Are there benefits to taking part in the research?

There may be no direct benefit to the participation by you in this project. However, the findings from this project may assist you, your director, and other EI professionals in identifying ways to improve the quality of intervention practices. You and your colleagues may also find the results useful in planning or evaluating current policies and services. Some EI professionals find it interesting (beneficial) to participate in a research study and enjoy working with university faculty to analyze and interpret the findings. This project is one of only a few in the nation to be funded to develop this type of embedded intervention approach. We believe this is an important and exciting opportunity that you may see as being beneficial to your students, community, and your state.

What about privacy and confidentiality?

All records relating to the Year 1 and 2 studies will remain confidential to the extent allowed by law and will be handled and safeguarded according to university policies. Videotapes and audio recordings that are used for data coding and analysis will be kept in a locked office at CFDC. For our analysis of triadic interactions, the behavior of adults (providers and caregivers) on the videotapes will be coded in 30-sec intervals. We will assign an ID number to your survey data and will input the data for analysis using only this ID number. No personally identifiable information will be included in study reports. Only the research team members will have access to the raw data. We will not release any information about you specifically unless compelled to protect your rights or welfare (for example, the UIC Institutional Review Board and State of Illinois auditors may monitor the study or consent process) or if required by law. When the results are published or discussed at conferences, no information will be included that will reveal the identity of the participants. Only de-identified data will be transmitted for statistical analysis. If we want to use your video footage as part of our training materials, your face and image will be identifiable. We will use your video footage for training about EPIC only with your written consent. These training videotapes will be kept indefinitely. All other videotapes coded for research will be maintained for 7 years or until June, 2020 and then destroyed.

Must I participate?

Your participation is voluntary and there is no obligation for you to participate in these studies. If you agree to participate, you can "opt out" by contacting me at (312) 413-1563 or Antonela Ciupe, the site coordinator for the project, at (312) 413-1389. You may also refuse to answer questions you don't want to answer and still remain in the study.

How does being a UIC employee impact my participation?

Your participation in this research is in no way a part of your university duties, and your refusal to participate will not affect your employment with the university, or the benefits, privileges, or opportunities associated with your employment at UIC. You will not be offered or receive any special consideration if you participate in this research. Your decision whether or not to participate is voluntary and will not affect your status within CFDC. If you decide to participate, you may withdraw at any time. You will be given a copy of this form for your information and to keep for your records.

If you have any questions about your rights as a participant in this project, you may call the Office for Protection of Research Subjects at (312-996-1711 or 866-789-6215), or email them (uicirb@uic.edu).

Signature of Participant

I have read the above information. I have been given an opportunity to ask questions and my questions have been answered to my satisfaction. I agree to participate in either the Year 1 or Year 2 study, and will complete the research activities delineated in this letter. I have been given a copy of this form.

Signature

Date

Printed name

Signature of Project Representative

Date (must be same as above)

Office for the Protection of Research Subjects (OPRS)
Office of the Vice Chancellor for Research (MC 672)
203 Administrative Office Building
1737 West Polk Street
Chicago, Illinois 60612-7227

UIC Amendment # 7

Administration	Percentage
Current Administration	85%
Previous Administration	15%

Dear Dr. Salisbury:

Please be reminded that only UIC email addresses must be listed for the Principal Investigator and/or research team:

From the OPRS website: <http://research.uic.edu/node/4117>

- All OPRS related correspondence will only be sent to UIC email addresses. To ensure timely receipt of important correspondence from OPRS, investigators should carefully review all e-mails received from OPRS.
- As per the UIC Information Technology Security Program (<http://security.uic.edu/policies/>), "The Workforce, including select student employees as identified by a Unit in Policy PER.2 Job Descriptions, Responsibilities, and Training, must use university administered messaging systems (e.g. email, instant messaging, document sharing) to conduct university business." Consistent with this campus-wide policy, OPRS strongly encourages investigators to ONLY use their UIC email address for conducting human subject research, including completion of investigator training, submission of research applications, communications with OPRS and ALL conduct of human subject research.

Members of Institutional Review Board (IRB) #2 have reviewed this amendment to your research and/or consent form under expedited procedures for minor changes to previously approved research allowed by Federal regulations [45 CFR 46.110(b)(2)]. The amendment to your research was determined to be acceptable and may now be implemented.

Please note the following information about your approved amendment:

Amendment Approval Date: August 26, 2016

Amendment:

Summary: UIC Amendment #7 dated August 15, 2016 and received August 16, 2016: An investigator-initiated amendment involving the addition of Gina Braun and Elizabeth Cambray-Engstrom as Key Research Personnel. Both of these people were added on the Appendix P – Co-Investigators/Other Key Research Personnel form.

Please note the Review History of this submission:

Receipt Date	Submission Type	Review Process	Review Date	Review Action
08/16/2016	Amendment	Expedited	08/26/2016	Approved

Please be sure to:

→ Use only the IRB-approved and stamped consent document(s) and/or HIPAA Authorization form(s) enclosed with this letter when enrolling subjects.

→ Use your research protocol number (2013-0610) on any documents or correspondence with the IRB concerning your research protocol.

→ Review and comply with all requirements on the guidance document,
"UIC Investigator Responsibilities, Protection of Human Research Subjects"
(<http://tiger.uic.edu/depts/ovcr/research/protocolreview/irb/policies/0924.pdf>)

Please note that the UIC IRB #2 has the right to ask further questions, seek additional information, or monitor the conduct of your research and the consent process.

Please be aware that if the scope of work in the grant/project changes, the protocol must be amended and approved by the UIC IRB before the initiation of the change.

We wish you the best as you conduct your research. If you have any questions or need further help, please contact the OPRS at (312) 996-1711 or me at (312) 355-2939. Please send any correspondence about this protocol to OPRS at 203 AOB, M/C 672.

Sincerely,

Jewell Hamilton, MSW

IRB Coordinator, IRB # 2

Office for the Protection of Research Subjects

Enclosure(s): None

cc: Norma Lopez-Renya, Special Education, M/C 147

IRB Amendment to Research Protocol and/or Consent Document Expedited Review UIC Amendment # 8**Approval Notice
Amendment to Research Protocol and/or Consent Document – Expedited Review
UIC Amendment # 8**

November 10, 2016

Christine Salisbury, PhD



RE: **Protocol # 2013-0610**
“Embedded Practices and Intervention with Caregivers (EPIC)”

Dear Dr. Salisbury:

Members of Institutional Review Board (IRB) #2 have reviewed this amendment to your research and/or consent form under expedited procedures for minor changes to previously approved research allowed by Federal regulations [45 CFR 46.110(b)(2)]. The amendment to your research was determined to be acceptable and may now be implemented.

Please note the following information about your approved amendment:

Amendment Approval Date: November 9, 2016

Amendment:

Summary: UIC Amendment #8 dated November 4, 2016, and received November 7, 2016, is an investigator-initiated amendment to add research personnel Deborah Faermak and Allison McGrath (Appendix P).

Approved Subject Enrollment #: 75 (18 enrolled to date)

Performance Sites: UIC, Florida State University

Sponsor: US Dept of Education/IES

PAF#: 00003052

Grant/Contract No: R324A130121

Grant/Contract Title: Embedded Practices and Intervention with

Caregivers (EPIC)

Please note the Review History of this submission:

Receipt Date	Submission Type	Review Process	Review Date	Review Action
11/07/2016	Amendment	Expedited	11/09/2016	Approved

Please be sure to:

→ Use your research protocol number (**2013-0610**) on any documents or correspondence with the IRB concerning your research protocol.

→ Review and comply with all requirements on the guidance:

"UIC Investigator Responsibilities, Protection of Human Research Subjects"
(<http://research.uic.edu/irb/investigators-research-staff/investigator-responsibilities>)

Please note that the UIC IRB #2 has the right to ask further questions, seek additional information, or monitor the conduct of your research and the consent process.

Please be aware that if the scope of work in the grant/project changes, the protocol must be amended and approved by the UIC IRB before the initiation of the change.

We wish you the best as you conduct your research. If you have any questions or need further help, please contact the OPRS at (312) 996-1711 or me at (312) 996-9299. Please send any correspondence about this protocol to OPRS at 203 AOB, M/C 672.

Sincerely,

Allison A. Brown, PhD
IRB Coordinator, IRB # 2
Office for the Protection of Research Subjects

Enclosure(s): None

cc: Norma Lopez-Renya, Special Education, M/C 147

VITA
ANTONELA ADELAIDA CIUPE
EDUCATION

<i>Doctor of Philosophy</i> in Special Education	University of Illinois at Chicago	2011- 2017
<i>Master of Science</i> in Child Development Infant Studies Specialization	Erikson Institute, Chicago, IL	2008-2010
<i>Bachelor of Science/</i> <i>Master of Science</i> in Psychology, Education Specialization	Tibiscus University, Romania	1994-1999

RESEARCH EXPERIENCE

Early Head Start Assessor – Research Division, The Ounce of Prevention Fund, Chicago 2016 -2017

- Conduct assessments for the Educare Early Head Start Program
- Share assessment results with the teachers and assist them in supporting children's communication skills

Research Assistant - University of Illinois at Chicago 05/2015-08/2015

Chicago Teacher Pipeline Partnership, PRAIRIE Group

- Conducted interviews assessing teacher preparation program effectiveness to prepare diverse teacher candidates for high-need Chicago Public Schools
- Identified common themes through analyzing interviews to provide relevant recommendations for program development
- Assisted with writing and revisions of annual progress reports

Research Coordinator - University of Illinois at Chicago 05/2013-05/2015

Embedded Practices and Intervention with Caregivers (EPIC) Project

- Developed and refined online teaching modules aimed at increasing early intervention providers' ability to coach caregivers in supporting the learning and development of children with disabilities
- Analyzed focus groups data to identify feasibility and utility of intervention implementation
- Coded videotapes to determine the fidelity of intervention implementation
- Coordinated day-to-day project activities and monitored the progress of Project EPIC objectives

Intern - Illinois Part C Early Intervention Task Force 05/2013-08/2013

- Reviewed Chicago Public Preschools assessment tools and made procedural recommendations to improve early intervention assessment effectiveness

Research Assistant - University of Illinois at Chicago 09/2012-04/2013

Child and Family Development Center

- Conducted searches for relevant literature and coded studies based on inclusion criteria
- Critiqued and synthesized key findings from peer reviewed journals
- Created an electronic database to organize key information

Research Assistant - University of Illinois at Chicago

10/2011-08/2012

Early Reading First Project (Chicago Public Preschools)

- Performed assessments and implemented literacy interventions

Research Assistant - Erikson Institute

09/2009-05/2011

Early Mathematics Project (Chicago Public Preschools and Kindergartens)

- Assessed children and conducted language observations

TEACHING IN HIGHER EDUCATION EXPERIENCE

Teaching Assistant - University of Illinois at Chicago

03/2016-05/2016

SPED 578 Classroom-Based Inquiry

- Provided ongoing feedback to special education and general education students on their action research projects

Teaching Assistant - University of Illinois at Chicago

08/2014-12/2014

SPED 482 Collaborating with Families and Professionals

- Revised and restructured syllabus according to professional standards and advances in research
- Prepared PowerPoint presentations on developing professional-family partnerships and communicating with families
- Co-taught graduate-level students preparing to enter the special education field
- Developed and graded assignments to assess progress and adjust teaching strategy

EARLY INTERVENTION EXPERIENCE

Developmental Therapist - Project Org + Design Studio, Inc, Chicago, IL

06/2010- 06/2011

- Provided home-based developmental therapy and assessment for infants and toddlers with various developmental delays
- Collaborated effectively as a co-therapist in play group sessions
- Developed multi-disciplinary intervention plans with parents, service coordinator, speech and language pathologist, occupational therapist and physical therapist

Intern - Northwestern Memorial Hospital, Chicago, IL

09/2009-04/2010

- Performed developmental assessments at the Neonatal Intensive Care Unit Follow Up Program for premature infants
- Worked as part of a multidisciplinary team which included a neonatologist, a psychologist, physical/occupational and speech therapists

Intern - Children's Memorial Hospital, Chicago, IL

09/2009-04/2010

- Evaluated cognitive and social emotional status of children 0-3 with various diagnoses
- Worked as part of the Early Intervention Medical Diagnostic Team including Developmental Pediatrician, Speech/ Occupational and Developmental Therapists

Developmental Therapist for Visually Impaired Children - Arad School Center

09/1998-09/2002

A pilot program coordinated by Sensus, The Netherlands

- Provided support to visually impaired children and their families
- Designed and implemented interventions based on assessment results to significantly enhanced child's development

TEACHING AND COUNSELING EXPERIENCE

Special Education Teacher, Special School No 5 – Bucharest, Romania

2007-2008

- Managed a class of 10 children (8-11 years old) with mild learning disabilities and diverse cultural backgrounds
- Adapted programs and methods to children's various development levels and social backgrounds
- Succeeded in bringing most students to the school curriculum's expected level of achievement, both academically and behaviorally

Counselor and Speech Therapist, Cabinet PsihoConsult, Bucharest

2006-2008

- Provided assessments, speech therapy and counseling for preschool and primary school children and their families
- Guided them in the effective recovery from speech and cognitive delays, and emotional / family problems

Speech Therapist, Magic Art Theatre Foundation, Bucharest

2003-2005

- Supported preschool children to enhance communication, interpersonal skills, and cognitive development using creativity games, art, and speech therapy

Psychologist - Visual Perceptive Education, Arad School Center

2000-2003

- Counseled and provided tailored instruction for special education classes to empower significant progress for over two hundred children with visual impairments
- Guided teachers in adapting curricula to children's needs

SPECIALIZATIONS and CERTIFICATIONS

- IRB Certification (2013-Present)
- Certificate of College Teaching Preparation, UIC School of Public Health (2013-2014)
- Leadership Education in Neurodevelopmental and related Disabilities (2012-2013)
- Illinois Early Intervention Developmental Therapy Credentials (2010)
- Specialization in Speech Therapy, Romanian Speech Therapists Association (2004-2006)
- Licensed Counselor under supervision, Romanian College of Psychologists (2006)
- Certified K-12 Grade Teacher, Faculty of Psychology and Education, University of Bucharest, Romania (2002)
- Specialization in Individual and Group Experiential Psychotherapy, Romanian Society of Experiential Psychotherapy (1999-2001)
- Basic Existential Counseling, Existential and Logo-therapy Society, Arad, Romania (1999-2001)
- Specialization in Early Intervention for visually impaired children, Sensis, Netherlands (June 1998, and June 2001)

QUALIFICATIONS in ASSESSMENT TOOLS

- Bayley Scales of Infant and Toddler Development (Third Edition)
- Hawaii Early Learning Profile
- Capute Scales - Cognitive Adaptive Test, Clinical Linguistic and Auditory Milestone Scale
- Vineland – Social Emotional Early Childhood Scales
- Ages and Stages Questionnaire (ASQ)
- Screening Tool for Autism in Toddlers (STAT)
- Assessment Evaluation and Programming System for Infants and Children (AEPS)
- Woodcock Johnson
- Early Screening Inventory for Kindergarten (EASY-K)
- Peabody Picture Vocabulary Test (PPVT)
- Preschool Language Scale 5, (PLS 5)

VOLUNTEER EXPERIENCE

Child Development Specialist - The Women's Treatment Center, Chicago, IL
09/2010-05/2011

- Provided child development training to volunteers and guidance on structure adaptation for child care sessions
- Served alongside volunteers and Treatment Center staff during parent meetings
- Coordinating with staff to provide child development parent education session

Education Volunteer - Peggy Notebaert Nature Museum, Chicago, IL
03/2008-11/2008

- Guided children (0-6 years old) in developing language, literacy, creativity, fine motor skills, natural science, and environment appreciation, through story reading, art and educational games

PRESENTATIONS AND PUBLICATIONS

Ciupe, A., & Salisbury, C. (January, 2017). *Embedded Practices and Intervention with Caregivers*. UIC College of Education 8th Annual Research Day. Chicago, IL, USA.

Ciupe, A. & Salisbury, C. (October, 2016). *Examining Caregivers' Independence in Early Intervention Home Visit Sessions*. The Division for Early Childhood (DEC) 32nd Annual International Conference on Young Children with Special Needs and Their Families. Louisville, KY, USA.

Ciupe, A. & Salisbury, C. (June, 2016). *Empowering Caregivers in Early Intervention*. The international Society on Early Intervention Conference. Stockholm, Sweden

Ciupe, A. (March, 2016). *Using Coaching Strategies with Caregivers of Young Children with Disabilities*. Inocenti Foundation 1st International Conference on Early Intervention for Children with Disabilities. Bistrita, Romania.

Ciupe, A. & Salisbury, C. (October, 2014). *Patterns of Interaction in Early Intervention Home-Visits*. University of Illinois at Chicago Research Day.

Ciupe, A. & Salisbury, C. (October, 2013). *Application of Sequential Analysis to Early Intervention Home-Visits*. The Division for Early Childhood (DEC) 30th Annual International Conference on Young Children with Special Needs and Their Families. San Francisco, CA, USA.

Ciupe, A. (2007). Drawing as a Way of Communication, Diagnosis and Therapy of the Child. *Logos – the Journal of the Romanian Association of Speech Therapists*, 11, 17-21.

Ciupe, A. (July, 2002). *Early Intervention for Visually Impaired Children in Romania*. The International Council for Education of People with Visual Impairment World Conference, Noordwijkerhout, the Netherlands.

Ciupe, A. & Marin, A. (October, 2000). *The Corrective – Compensatory Functions of Experiential Psychotherapeutic Techniques Applied to Visually Impaired Children*. the First Balkan Conference for Education of People with Visual Impairment. Varna, Bulgaria.

ADDITIONAL SKILLS

- *Computer skills*: MS Office, SPSS, Atlas, Noldus
- *Languages*: English, native Romanian