

Analysis of Transactional Interactions in Triadic Early Intervention Home Visits

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THESIS

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LIST OF ABBREVIATIONS

ASD	Autism Spectrum Disorder
CVF	Content Validation Form
DV	Dependent Variables
EHS	Early Head Start
EI	Early Intervention
EMT	Enhanced Milieu Teaching
EPIC	Embedded Practices and Intervention with Caregivers
FGRBI	Family-Guided Routines-Based Intervention
HVOF	Home Visit Observation Form
HVORS A+	Home Visit Rating Scales-Adapted & Extended to Excellence
I-CVI	Item-Content Validity Index
IGDI	Individual Growth and Development Indicators
IV	Independent Variables
NERS	Natural Environments Rating Scale
SCD	Single Case Design
SOOPR	Setting the Stage, Observation and Opportunities to Practice, Problem Solving and Reflection, and Review
TIERS	Triadic Intervention and Evaluation Rating Scale
TIERS-R	Triadic Intervention and Evaluation Rating Scale-Revised
UFS	User Feedback Survey

SUMMARY

In recent years, the field of early intervention (EI) has experienced a shift from traditional, child-focused intervention to a triadic approach in which the provider works with and through the caregiver during home visits to support child learning and development. Caregiver coaching is a leading practice for building caregiver capacity and promoting child outcomes. However, very little is known about which specific provider practices, or behaviors, are associated with caregiver adoption of specific development-promoting behaviors. More information on how adult behaviors in triadic interactions change over time, how provider or caregiver behaviors in home visits increase or decrease in response to changes in the other's actions, would offer a better understanding of the effects of specific coaching practices. Studies that have examined adult behaviors that occur in triadic home visits have used a variety of measures and their modified and revised versions (e.g., *Natural Environments Rating Scale (NERS)*; Campbell & Sawyer, 2004), *Home Visits Observation Form (HVOF)*; McBride & Peterson, 1993, etc.). However, none of these tools captures the reciprocal nature of adult behaviors as they occur within adult interactions in home visits. Thus, a multi-phase study was carried out to revise an existing assessment tool, the *Triadic Intervention Evaluation Rating Scale (TIERS)*; Basu, 2007) to better identify associations between specific provider and caregiver behaviors and generate a richer description of what occurs during triadic home visits.

The *TIERS-R* was developed through a systematic four-phase process: (a) content and format revision, (b) expert validation, (c) feasibility testing, and (d) small-scale evaluation. Item content was revised to reflect current, evidence-informed practices, and the format and coding procedures were revised to measure reciprocal adult behaviors. Following the initial revision of the *TIERS*, 11 experts (six researchers/faculty and five practitioners) evaluated

SUMMARY (continued)

the tool's item content and format to determine if the *TIERS-R* captures relevant, observable, and measurable adult behaviors. Expert feedback guided the second iteration of the *TIERS-R*. The five practitioners coded two, 10-minute videos segments of triadic home visits to test the tool's feasibility using its coding form and administration manual. The five practitioners completed a *User Feedback Survey (UFS)* evaluating the appeal and utility of the tool. Practitioner *UFS* responses guided the final iteration of the *TIERS-R*. During the final phase of the study, two trained raters participated in a small-scale evaluation of the *TIERS-R* to: (a) examine associations between provider and caregiver behaviors, and (b) determine if and how provider and caregiver behaviors change over time. Raters coded videos extracted from the “*Embedded Practices and Intervention with Caregivers*” (EPIC) single case design study (Woods et al., 2013) to evaluate the tool's ability to assess provider-caregiver behaviors as they occur over the course of the triadic intervention process.

Findings from the small-scale evaluation of the *TIERS-R* revealed both strong positive and negative sequential associations between some provider and caregiver behaviors defined in the *TIERS-R*. Social validity results showed that the *TIERS-R* captures relevant, observable, and measurable provider-caregiver behaviors that occur during triadic intervention. Descriptive data across the four child-caregiver dyads and the provider show increases and decreases in provider and caregiver behaviors as intervention sessions progress. Providers reduced their implementation of directive coaching strategies, such as “prompts participation” and “provides caregiver explicit feedback” towards the end of the intervention sessions as caregivers adopted more child-directive behaviors, such as “provides child explicit feedback” and “arranges environment for child.” Provider and caregiver behaviors shifted from the provider guiding the

home visit session to the caregiver assuming the leadership role. Limitations and implications for future research and practice are discussed.

I. INTRODUCTION

Statement of the Problem

Current practice in early intervention (EI) emphasizes the importance of building caregiver capacity and strengthening caregiver-child interactions to produce positive child outcomes. To build caregiver capacity, the provider needs to work with and through the caregiver as both engage with the child (McCollum & Yates, 1994; Woods et al., 2011). The presence of provider, caregiver, and child in the same EI session is referred to as triadic intervention, (Trivette & Keilty, 2017) and this approach has its roots in adult learning (Knowles et al., 2005), ecocultural (Bernheimer et al., 1990), and transactional (Shonkoff & Meisels, 2000) theories. The common ground across these theories is the importance of meaningful caregiver-child interactions that occur in the family's natural environment and within the context of the family's authentic, daily routines (Friedman et al., 2012). Triadic intervention enhances such positive caregiver-child interaction and is achieved through collaborative adult interactions that build caregiver capacity and confidence. During triadic home visitation sessions, EI providers offer caregivers expert knowledge on how to meet the individual needs of their children with disabilities. Providers encourage caregivers to become active participants in the decision-making process and expand on their knowledge and skills by teaching strategies to caregivers that support the child's learning and development independently and successfully. Although there is growing evidence that triadic intervention can facilitate the caregiver's adoption of strategies that promote positive child outcomes (Brown & Woods, 2016; Kashinath et al., 2006; Meadan et al., 2016; Windsor et al., 2019), remarkably little is known about which provider teaching behaviors are associated with caregiver behaviors.

Researchers have used a variety of assessment methods and measures to examine provider-caregiver behaviors and triadic interactions that occur among provider, caregiver, and child during home visits, the quality of home visits, and components of home visiting. Investigators have evaluated home visits using: (a) rating scales (Campbell & Sawyer, 2007, 2009; Colyvas et al., 2010; Fleming et al., 2011; Peterson et al., 2018; Roberts & Kaiser, 2012; Roggman et al., 2012; Sawyer & Campbell, 2017; Windsor et al., 2019), (b) checklists and protocols (Brown & Woods, 2015; Cambray-Engstrom & Salisbury, 2010; Ciupe & Salisbury, 2020; Krick Oborn & Johnson, 2015; Meadan et al., 2016; Peterson et al., 2007; Salisbury et al., 2012; Salisbury & Cushing, 2013), and (c) surveys, questionnaires, and interviews (Douglas et al., 2020; Kashinath et al., 2006; McBride & Peterson, 1997; Salisbury et al., 2017). Although these studies provide insights into many aspects of triadic home visiting, none of the measures captured how specific provider behaviors impact, or directly promote change in specific caregiver behaviors during triadic home visiting. Further, none of these investigations described how adult behaviors evolved across intervention sessions. By focusing on both reciprocal provider-caregiver behaviors and adult behaviors as they change over time, it may be possible to better understand how providers' actions impact what caregivers learn and do with their child in authentic home environments.

To advance our understanding of the mutual effects of adult behaviors, it is necessary to develop a means of capturing the reciprocal and transactional nature of provider-caregiver interactions. By revising evaluating and testing the *Triadic Intervention Evaluation Rating Scale* (Basu, 2007) a stronger assessment of the association between provider practices and caregiver level of participation will be possible during EI home visits. Yet, measuring the association between provider practices and caregiver participation is necessary, but not sufficient for

understanding what specific provider practices are most strongly, and sequentially, associated with caregiver adoption of development-promoting behaviors. Embracing a systematic approach to refining the *TIERS* would better capture specific provider teaching strategies that foster caregiver adoption of development-promoting behaviors.

Assessing Triadic Home Visits

Early studies of what transpires during home visits revealed that providers were rooted in traditional, child-focused EI practices despite the promise of triadic intervention (Campbell & Sawyer, 2007; Peterson et al., 2007). These early investigations examined how providers engaged with caregivers during home visits and found that provider behaviors were primarily child-focused, and providers did not consistently use intentional instructional strategies to improve caregiver adoption of supportive behaviors (e.g., Campbell & Sawyer, 2007, 2009; Peterson et al., 2007; Sawyer & Campbell, 2017). The primary method of characterizing home visits was through the use of measures designed to: (a) evaluate adult roles in home visits, (b) distinguish between providers' use of child-focused intervention practices and participation-based practices, and (c) assess the frequency with which providers used collaborative practices and instructional strategies that are supportive of caregiver learning (cf. *Natural Environment Rating Scale (NERS)* (Campbell & Sawyer, 2004), the *Natural Environment Rating Scale-Revised (NERS-R)* (Campbell & Sawyer, 2008), the *Home Visit Observation Form (HVOF)* (McBride & Peterson, 1993), the *Home Visit Observation Form-Modified (HVOF-M)* (McBride & Peterson, 1997), the *Home Visit Observation Form-Revised (HVOF-R)* (McBride & Peterson, 1996), and the *Home Visit Rating Scales-Adapted & Extended to Excellence (HVORSA+)* (Roggman et al., 2012). These measures typically required observing either in situ or from videotapes and coding specified behaviors as they occurred in predetermined intervals. These

studies produced important information about roles, adult behaviors, content discussed during interactions, and interaction partners, all of which contributed to our basic understandings of what occurs during home visiting.

Limitations

While the *NERS*, *NERS-R*, *HVOF*, *HVOF-M*, *HVOF-R*, and *HVORSA+* contributed considerably to the field's knowledge and understanding of what occurs during home visits, as well as to descriptions of the overall quality of home visits, these tools do not capture *specific reciprocal adult behaviors* nor the *changing nature of adult transactional interactions* that are the foundation of productive and meaningful triadic home visits. The *NERS* is designed so that raters can distinguish between traditional and participation-based home visits, but it does not measure or document the occurrence of provider or caregiver intervention strategies or behaviors. While the *HVOF*, *HVOF-M*, and *HVOF-R* are more exhaustive and each evaluates primary interaction partners, the content of interactions, and providers' activities, collectively they are unable to establish whether caregivers were responsive to providers' instruction and specific coaching strategies during EI home visits. Recently, the *HVORSA+* (Roggman et al., 2012) was developed to generate a more in-depth description of triadic home visiting by measuring the quality of practices and caregiver and child engagement. This tool assesses home visit characteristics and quality across four scales related to the quality of home visiting (provider responsiveness to caregiver and child, provider relationship with caregiver and child, provider facilitation of caregiver-child interactions, and provider nonintrusive collaboration) and three scales targeting the effectiveness of home visits (caregiver-child interaction, caregiver engagement, and child engagement). However, while the *HVORSA+* delves deeper into the content and quality of adult interactions during home visiting, it does not capture which specific

provider behaviors promote change in caregiver behaviors. Given that the purpose of EI is to build the capacity of caregivers, it is critical that we be able to assess the impact of provider actions on caregiver knowledge and skill. By examining specific adult behaviors and analyzing the sequence of those behaviors, it may be possible to understand the mutual effects of adult behaviors on one another.

Base Measurement Scale – Triadic Intervention and Evaluation Rating Scale (*TIERS*)

Basu (2007) developed the initial version of the *TIERS* to assess adult interaction patterns during triadic home visits by correlating specific provider behaviors with levels of caregiver participation within single routines. The process for developing the original *TIERS* involved a series of steps designed to create a holistic picture of provider-caregiver interactions during EI sessions. The development plan occurred in four phases: (1) designing the *TIERS*, (2) establishing a rating scale, (3) establishing four transaction styles, and (4) assessing measurement properties (Basu et al., 2010).

Basu and colleagues (2010) reported on how the items for the original *TIERS* were selected in Phase 1 the 2007 study. The content-selection process included identifying routine categories for analysis, developing a list of provider behaviors to be examined, and developing a list of caregiver behaviors to be examined. Routines (e.g., play with objects, pretend play, bath/hygiene related, dressing related, etc.) were selected from routine categories commonly found EI sessions (cf. Dunst et al., 2001; Woods, 2005). The *TIERS* provider behavior items were identified from existing home-visit measures (Cripe & Venn, 1997; Woods, 2005) and items drawn from the extant literature (Baird et al., 1992; Blue-Banning et al., 2004; Campbell & Sawyer, 2007; Hanft et al., 2004; McBride & Peterson, 1997; McCollum et al., 2001; Sandall et al., 2005). These provider behaviors were developed into “observable action statements” and

evaluated for clarity and relevance by program administrators, resulting in 21 items. A similar process was used to determine caregiver behaviors. Caregiver behaviors were derived from a review and analysis of measures commonly used to evaluate caregiver-child interactions and caregiver involvement and engagement (Kaiser & Hancock, 2003; Kashinath et al., 2006; McBride & Peterson, 1997; Trivette & Dunst, 2000), resulting in 12 caregiver behaviors (Basu et al., 2010).

In Phase 2, a rating scale structure was determined for the original *TIERS*. The instrument consisted of three sections: (1) a provider section, (2) a caregiver section, and (3) a “schematic representation” used to determine primary roles and relationships among the triad during intervention sessions (Basu, 2007). A 3-point ordinal scale was developed to be used for rating the relative proportion of behaviors observed for both provider and caregiver sections. Ratings were to be made on a scale of 1 (*not observed*) to 3 (*nearly always observed*) (Basu, 2007). The *TIERS* was assessed by having 9 qualified individuals rate provider and caregiver behaviors. Separate from the *TIERS* rating scale was a page that included a relationship triangle. Raters depicted who the primary interacting partners were during the observed video segments by highlighting a dotted line on a triangle where caregiver, provider, and child were the corner anchors. Finally, raters also marked “actor,” “passive actor,” “active observer,” or “non-participant” to denote the roles that each adult assumed for most of the observed segment (membership-roles table) (Basu, 2007). Table 5 reflects the original *TIERS* item wording and rating scale.

In Phase 3, the 21 identified provider behaviors were conceptually grouped into four transaction styles based on extant research on family-centered EI practices. The identified styles were: (a) “observing and information sharing,” (b) “joint interaction and problem solving,” (c)

“practice with feedback and reflection,” and (d) “direct teaching and guided practice” (Blanchard et al., 1999; Campbell & Sawyer, 2007; Hebbeler & Gerlach-Downie, 2002; Kaiser et al., 2000, as cited in Basu et al., 2010). Also, based on existing EI literature, three groupings of caregiver behaviors were identified to indicate different levels of caregiver participation.

In Phase 4, the quality of information generated by the *TIERS* was evaluated. Various validation methods were used to evaluate the utility and internal consistency of the *TIERS* (Basu et al., 2010). Adhering to Downing and Haladyna’s (2006) standards for evaluating procedural and empirical validity, it was determined that the *TIERS* met the basic guidelines for “internal consistency, interrater agreement, and cross-rater reliability” (Basu et al., 2010). Most importantly, in the development of the tool, evidence was presented showing that the *TIERS* could provide an understanding of the degree of collaboration during EI home visits (Basu et al., 2010). The *TIERS* offers advantages over prior measures because it links provider behaviors with caregiver behaviors as they occur during triadic intervention and is psychometrically more rigorous than other measures.

Limitations

While the *TIERS* provides an important foundation for measuring adult interactions in authentic EI home visit sessions, additional work is needed to move beyond a linear view of adult behaviors. Because these provider and caregiver behaviors were static snapshots, rather than dynamic characterizations of mutual effects, it is not possible to identify contingent responses using the original scale, nor is it possible to identify who initiates a specific interaction. The *TIERS* currently measures provider-initiated, instructional behaviors that are expected to promote caregiver engagement during home visits and improve caregiver adoption of supportive behaviors that enhance child learning and development. However, the *TIERS* does

not measure the reciprocal effects of interactions between adults in a home visit. Specifically, it does not connect which specific behaviors caregivers used in response to specific practices employed by providers. Further, the items comprising the *TIERS* do not reflect recent empirical advances in the field of EI. Those advances have led to a refinement in how the field defines and thinks about caregiver coaching, capacity building, and embedded instruction practices (cf. Friedman et al., 2012). Following the initial evaluation of procedural and empirical validity of the *TIERS*, there appeared to be evidence that the general utility of the measure was promising (Basu et al., 2010).

Absent from that analysis was an examination of changes in adult behaviors over time. That is, the nature of triadic home visiting is such that adult behaviors across sessions will inevitably evolve over the course of the intervention process. The premise of EI is that as the provider builds the capacity and confidence of the caregiver, the caregiver will acquire new knowledge and skills over time that will result in less need for directive behaviors from the provider (Peterson et al., 2007). While the *TIERS* provides a picture of how providers' use of coaching practices might impact caregivers' participation during home visits, refining aspects of the measure should offer a thicker description of potential mutual effects of adult interactions as they occur during triadic EI sessions.

Research Gap and Study Focus

A significant gap in the home visiting research literature exists with regard to how best to measure *reciprocal adult behaviors* and how to best capture the *evolving nature of adult interactions* during triadic home visits. Studies and assessment tools alike have focused on describing linear interactions and tended to overlook the reciprocal effects that occur within an interaction. A tool is needed that can help determine if adults are responsive to one another and

whether their interactions truly reflect exchanges that impact how they engage with the child. To describe and measure reciprocal interaction within a home visit, it is necessary to establish which provider behaviors, or specific instructional strategies, are associated with caregiver use of development-promoting behaviors. Preliminary efforts to describe the relation between provider behaviors and caregiver engagement during home visits have provided insight into adult interactions as they occur during triadic home visits [cf. Brown & Woods, 2015, 2016; Ciupe & Salisbury, 2020; Cambray-Engstrom & Salisbury, 2010; Kashinath et al., 2006; Salisbury & Cushing, 2013; Windsor et al., 2019]. Despite these advances, there is still a need to delve into which specific provider strategies promote caregiver adoption of specific instructional skills. Presently, the *TIERS* does not allow us to identify a single adult turn-taking occurrence, nor does it permit examination of a series of adult reciprocal behaviors. Therefore, there is no way of knowing whether the interactions are functionally related to changes in caregiver behaviors.

The purpose of this study was to revise the *TIERS* by modifying its content, format, and coding procedures to enhance its ability to generate a richer description of adult interactions that occur in triadic home visits. Adult behaviors that are reciprocal in nature were included to extend the field's knowledge about which provider behaviors are most often associated with caregiver use of development-promoting behaviors. Knowing if adults are contingently responding to one another and if there is ongoing reciprocity within an interaction may enable us to determine which provider behaviors impact change in caregiver behaviors. This study had two aims: (1) to improve the content and social validity of the *TIERS*, and (2) to characterize adult interactions as they occur during and across triadic EI home visits using the *TIERS-R*. The following research questions guided this investigation:

1. Does the *TIERS-R* capture relevant, observable, and measurable adult behaviors as they occur during caregiver coaching and/or routines-based intervention?
2. Which provider behavior(s) or specific instructional strategy(ies), if any, are associated with caregiver specific use of development-promoting behavior(s) or instructional strategy(ies)?
 - 2.1 How do adult interactions change over time during triadic intervention?

II. LITERATURE REVIEW

The purpose of this literature review is to critically examine research related to triadic interactions among providers, caregivers, and their children with identified disabilities during early intervention (EI) home visits. Two bodies of intersecting research (i.e., EI home visits and EI models and practices) are reviewed. This review includes six sections: (1) definitions and terms used in the review; (2) a description of the conceptual foundations of triadic intervention; (3) a description of measures and their coding procedures used in the studies included in this literature review; (4) an analysis of the home visiting literature; (5) an analysis of measures, designs, and methods used in this body of research with a specific focus on how interactions are currently being measured; and (6) a discussion of gaps in the literature and types of investigations that are needed to address limitations in current knowledge and practice.

Definition and Terms

Home visits

Home visits are a naturalistic context for providing family centered EI services for infants and toddlers with moderate to severe disabilities and their families. The home is viewed as the child and family's natural environment, and their authentic daily activities and routines are considered the ideal context for embedding learning opportunities (Campbell & Sawyer, 2007). The literature also reveals an association between increased caregiver participation during home visits and improved family and child outcomes (Peterson et al., 2007). The emerging evidence suggests that targeting and improving caregiver capacity to provide "responsive and developmentally supportive care" promotes optimal home visiting outcomes (Peterson et al., 2018). Providers who deliver services via home visits are expected to build caregiver capacity

and foster caregiver-implemented intervention through meaningful and positive triadic interactions.

Child-Focused Intervention Home Visits. Child-focused interventions are one of two contrasting approaches to home visits . Traditional, child-focused EI home visits are dyadic and often provider-led (Salisbury & Cushing, 2013). Child-focused practice is generally considered to be a dated approach to EI. During traditional EI, the provider directly interacts with the child and often overlooks the caregiver as an integral player in the child's learning and development. The intervention only occurs during the allotted time of the home visit because the caregiver is not provided with the necessary strategies to support the child in the absence of the provider between visits (Childress, 2012). Furthermore, the provider does not always capitalize on naturally occurring routines, such as bath time or mealtime, to embed instruction and instead manufactures activities using outside materials that are unfamiliar and inauthentic to the child to create learning opportunities (Fleming et al., 2011). Traditional EI home visits often result in limited and inorganic learning opportunities for the child to practice and develop skills by dismissing the caregiver as a valuable and necessary team member, as well as by not using naturally occurring activities and routines as a context for embedding instruction. To increase learning opportunities and to improve child learning and development, it is essential that providers conceptually reframe their approach to EI home visits.

Triadic Intervention Home Visits. Triadic intervention is the second form of home intervention. Sessions include the provider, caregiver, and child, and interactions are designed to increase caregiver involvement during home visits (Salisbury & Cushing, 2013) and enhance caregiver-child interactions (Peterson et al., 2018). During triadic EI, the provider aims to build upon meaningful, caregiver-child interactions that are supportive of the dyad's relationship and

the child's development, simultaneously strengthening the caregiver's competence and confidence, an aspect of the capacity-building framework (Lorio et al., 2020). The provider's role is to build capacity by employing specific coaching practices and encouraging active caregiver engagement with the child (Peterson et al., 2018). Coaching practices have been described as falling on a continuum. At one end, some coaching practices are directive and provider-led; specifically, the practices are provider-implemented strategies that support caregivers in learning intervention strategies that enhance their child's development. At the other end, some coaching practices include strategies intended to build the caregiver's capacity through a "collaborative process" (Kemp & Turnbull, 2014; Lorio et al., 2020). During home visit sessions under a triadic approach, the provider directly targets caregiver learning under the assumption that enhancing caregiver capacity and confidence will lead to improved caregiver-child interactions and advanced child development (Peterson et al., 2007). There is general agreement that to enhance caregiver capacity, providers share relevant information that helps the caregiver make connections between purpose and practice, model behaviors when appropriate without disrupting the caregiver-child interaction, and make helpful suggestions based on recommended practices to improve upon the interaction (Friedman et al., 2012). This requires the provider to interact directly with the caregiver as opposed to traditional EI in which the provider primarily interacts with the child. The provider implements specific adult learning strategies so that caregivers will eventually adopt behaviors that support their child's learning without the assistance of the provider and in meaningful contexts in and outside of the home. The success of the triadic approach hinges on the caregiver's ability to adopt and use specific intervention strategies with accuracy and frequency (Roberts & Kaiser, 2011). Thus, the primary focus is to enhance caregiver-child interactions by building caregiver capacity and preparing

caregivers to deliver caregiver-implemented intervention supportive of child learning and development.

Conceptual Foundations of the Triadic Approach

Triadic intervention includes a provider, a caregiver, and a child; the provider, through a systematic teaching process, coaches caregivers to adopt practices that advance child learning and development as well as to focus on building collaborative relationships with families. This approach to EI is rooted in adult learning theory (Knowles, et al., 2005), ecocultural theory (Bernheimer et al., 1990), and transactional theory (Shonkoff & Meisels, 2000).

Adult Learning Theory. Approaches in which triadic interactions occur, such as building caregiver capacity, caregiver-implemented intervention, and embedded instruction, are situated in adult learning theory (Brown & Woods, 2016). Adult learning theory has three overarching principles: (1) adults learn best when there is an opportunity to actively engage in the learning process, (2) learning opportunities are based in authentic and relatable experiences, and (3) there should be sufficient and immediate opportunities to practice newly taught skills (Knowles et al., 2005). Adults are mostly likely to learn when their existing knowledge and experiences are used to scaffold new information (Bransford et al., 2000; Lorio et al., 2020). This theory directly applies to adult acquisition and adoption of behaviors needed to support caregiver and child development (Friedman et al., 2012). The delivery of triadic intervention requires the provider to support caregiver learning by systematically building the caregiver's capacity and confidence to enhance the child's learning and development. To build caregiver capacity, providers use adult learning strategies with the intent of shaping and/or changing caregivers' behaviors and attitudes so that caregivers can effectively promote child outcomes (Woods et al., 2011). To deliver adult learning strategies, providers must facilitate positive

triadic interactions in which the caregiver is an active participant in the decision-making process and the provider situates the caregiver as the agent of change.

Ecocultural Theory. Ecocultural theory focuses on the child's relationship with his/her family and environment. The family's beliefs, goals, and needs are considered as providers work with families during home visits in the family's natural environment. Ecocultural theory emphasizes using the child and family's authentic daily activities and routines as a context for learning (Bernheimer et al., 1990) and is the rationale for building caregiver capacity, caregiver-implemented intervention, and embedded instruction (Brown & Woods, 2016; Colyvas et al., 2010). Furthermore, Weisner (1984) explains that families will share similarities, and therefore the principles of ecocultural theory should be applicable to all families. For example, if two families come from vastly different socioeconomic backgrounds, providers should use the culture and routines that are relevant to the individual family as the foundation for facilitating the home visit. This theory has factored heavily in the bodies of research referred to as embedded instruction and routines-based intervention, both of which are contextualized approaches to designing interventions and support for families.

Transactional Theory. Transactional theory is similar to the ecocultural theory in that both highlight the impact of social relationships and the environment on child outcomes. Transactional theory posits that behavioral changes occur through a sequence of interchanges (interactions) among people (the triad) who share practices and principles within a common system (EI home visits) (Shonkoff & Meisels, 2000). These interactions affect not only the child, but also the ways in which the child's behavior influences how the caregiver responds to the child. If the mother changes her behavior to be more positive, transactional theory suggests that the child's crying will diminish. Children are always engaged in reciprocal transactional

relation(ships) with those who surround them and their environment (Sameroff & MacKenzie, 2003). In acknowledging the influence that surrounding relationships and the environment can have on a child, recommended practice has progressively focused on family-centered approaches to intervention, implemented in natural environments. Depending on individual family circumstances, re-educating the caregiver by refocusing and teaching them positive engagement behaviors for working with the child can be the most strategic and effective approach to supporting and improving child outcomes and family functioning (Shonkoff & Meisel, 2000). Approaches that involve a focus on building caregiver capacity, using caregiver-implemented intervention and embedded instruction, teach the caregiver how to support the child's needs and development in natural environments.

Core Constructs of EI Models and Practices

Capacity-Building. Capacity-building is a family-centered approach in which providers develop caregiver behaviors that support their child's learning within contexts that are authentic and familiar to the family (e.g., Brown & Woods, 2016; Cambray-Engstrom & Salisbury, 2010; Friedman et al., 2012). Capacity-building consists of a set of adult learning practices with three fundamental goals: (1) to build upon the caregiver's existing knowledge and skill set, (2) to promote the caregiver's acquisition of new skills, and (3) to enhance the caregiver's self-efficacy (Division for Early Childhood [DEC], 2014). Providers use the caregiver's priorities, concerns, and needs as a framework for setting functional, participation-based goals. To achieve goals, providers identify and capitalize on family strengths for embedding instruction and promoting child development and family functioning through individualized EI service delivery (Ottley et al., 2017; Trivette & Keilty, 2017).

Caregiver Coaching. *Caregiver coaching* is a prevalent capacity-building practice that promotes caregivers' acquisition of new skills that are supportive of child learning and development. (Brown & Woods, 2016; Douglas et al., 2020). Coaching is a collaborative process in which providers use a range of adult learning strategies to build upon the caregiver's existing knowledge and skill set and facilitate positive caregiver-child interactions (Salisbury & Cushing, 2013). Providers build caregiver capacity and confidence with the intent of reducing their own involvement as the caregiver takes on a leadership role during the home visits; it is expected that the caregiver will be able to employ development-promoting behaviors during and between home visits to enhance their child's learning and development in naturally occurring contexts (Friedman et al., 2012).

Caregiver-Implemented Intervention. Caregiver-implemented interventions are triadic in nature in that a skilled provider teaches a caregiver to use specific intervention strategies with their children during and between home visits, as the caregiver is likely the child's proximal interaction partner (Roberts & Kaiser 2012). The provider, caregiver, and child have "intersecting roles with reciprocal relationships" (Brown & Woods, 2016) as the provider teaches, or coaches, the caregiver how to use a variety of *social-communication* and/or *enhanced milieu teaching* (EMT) strategies (e.g., contingent responding, prompting, expansion) in interactions with their child. The primary focus for supporting the child's language development is on the caregiver's responsiveness and sensitivity to the child's behaviors in naturalistic environments (Woods et al., 2004). Caregivers are expected to learn and independently implement communication strategies in family-identified routines (Brown & Woods, 2016).

Enhanced Milieu Teaching (EMT). EMT is a conversation-based intervention model in which the adult capitalizes on the child's interests and verbal and non-verbal initiations to

promote and expand the child's communication development; it is commonly implemented by the caregiver (Kaiser & Roberts, 2013). The caregiver is the child's first and most consistent teacher, as functional communication occurs in authentic daily routines in which the caregiver is the most frequent communication partner. The caregiver can use a variety of strategies to increase: (a) the duration of communicative engagement, (b) the rate of communication, (c) the diversity of communication, (d) the complexity of communication, and (e) the communication independence (Kaiser & Hampton, 2014). EMT strategies include environmental arrangement, modeling, expansion, prompting, turn-taking, mirroring, open-ended questions, responding, and time delay (Roberts & Kaiser, 2012; Woods & Kashinath, 2007; Windsor et al., 2019).

Embedded Instruction. Embedded instruction is an evidence-based, recommended practice in which providers and/or caregivers systematically and intentionally provide children with contextualized instruction (Snyder et al., 2018). Embedded instruction has shown to be an effective practice in preschool settings (Rakap & Parlak-Rakap, 2011; Snyder et al., 2015). However, the implementation of embedded instruction with infants and toddlers during EI home visits is just emerging. In the context of home visits, providers are expected to use capacity-building practices that support caregivers' efforts to embed instruction within authentic daily routines (e.g., Woods et al., 2018). Learning opportunities are embedded in ongoing activities and use materials that are meaningful to and of interest to the child. The primary purpose of this approach is to embed sufficient learning opportunities into naturally occurring routines so that the child can frequently practice and develop functional skills in meaningful and relevant contexts. Research indicates that embedded instruction is linked to increased child participation (Snyder et al., 2015) and positive family and child outcomes (Brown & Woods, 2015; Jennings et al., 2012). The provider and caregiver are both responsible for embedding instruction but take

on distinct roles and use different strategies to promote learning and development, as their target is not the same. The provider's focus is the adult learner, or the caregiver, and the caregiver's focus is the child.

Family Guided Routines-Based Intervention (FGRBI). FGRBI is a collaborative, family-centered approach to intervention in which providers build caregiver capacity by integrating coaching and adult learning with evidence-based intervention (FGRBI; Woods, 2005). Providers promote functional outcomes by teaching caregivers how to embed sufficient learning opportunities into and across authentic daily routines using naturalistic intervention strategies. Further, providers encourage caregivers to adopt a more central role as decision-makers and facilitators for advancing their child's learning and development (Freidman & Woods, 2015; Kashinath et al., 2006; Windsor et al., 2019). The FGRBI approach emphasizes the importance of caregivers embedding instruction into daily activities and routines that are familiar and preferential to the child. This allows the child to focus on practicing and developing new skills rather than spending time adapting to a new environment (Jennings et al., 2012). Once the child has mastered a skill, he/she can apply it during new activities and routines. The caregiver can support acquisition of skills by presenting reasonable changes or challenges in the routine to elevate or expand upon a skill (Kashinath et al., 2006).

Participation-Based Services. The primary purpose of participation-based services is to support the child in becoming a participating member of the family unit and of the community (Campbell & Sawyer, 2007). The provider uses family-centered practices to increase learning opportunities in naturally occurring family activities and routines. As the caregiver directly interacts with and facilitates their child's learning and development, it is expected that the provider is simultaneously supporting, coaching, and teaching the caregiver to promote

meaningful caregiver-child interactions (Campbell & Sawyer, 2007). Furthermore, the provider teaches the caregiver two primary strategies for improving child participation and learning: (a) adjusting the setting, routines/activities, and materials to meet the needs of the individual child and (b) embedding contextualized instruction (Colyvas et al., 2010).

Analysis of Research on EI Models and Practices. High-quality home visits entail providers building caregiver capacity by coaching caregivers how to embed learning opportunities into authentic daily routines to improve their children's learning and development (Salisbury et al., 2017). One consistent finding in the capacity-building literature was that when providers effectively implemented coaching practices during EI home visits, caregivers' use of instructional strategies increased (Brown & Woods, 2015, 2016; Ciupe & Salisbury, 2020; Roberts & Kaiser, 2012; Swanson et al., 2011; Windsor et al., 2019). Brown and Woods (2016) found that caregivers were most likely to use caregiver-implemented intervention strategies either during or after providers used coaching strategies that encourage active caregiver participation. However, despite the call for caregiver coaching during home visits, several studies revealed that providers' use of coaching practices was infrequent and inconsistent (Campbell & Sawyer, 2007; Colyvas et al., 2010; Peterson et al., 2007; Salisbury et al., 2012), and perceived by providers as challenging to implement (Fleming et al., 2011; Salisbury et al., 2010; Salisbury et al., 2017). Fleming et al. (2011) discovered from interviewing providers that providers did not have a comprehensive understanding of participation-based services. Further, providers rarely expressed the importance of caregivers embedding learning opportunities into their child's authentic daily activities and routines, and providers neglected to communicate the importance of increasing the child's participation in activities and routines.

While the studies included in this review offered a range of information related to provider practices, adult interactions, and quality of home visiting, they evidenced two overarching conclusions: (1) despite the favorable impact of coaching on building caregiver capacity, caregiver-implemented intervention, and embedded instruction, providers have still demonstrated a general lack of understanding about and an inability to consistently implement capacity-building practices that are supportive of caregiver-implemented intervention and embedded instruction; and, (2) when providers do implement evidence-based practices as intended, caregivers are capable of adopting behaviors that improve child learning and development. These processes and practices require meaningful interactions, and without taking a closer look at reciprocal adult behaviors that occur during triadic interactions, it is difficult to understand what transpires between adults. A more comprehensive examination of adult interactions might deepen the field's understanding of which provider practices are most impactful, and therefore, improve upon the implementation of provider practices that support family and child outcomes. Table 2 includes studies in which investigators explored capacity building, caregiver-implemented intervention, and embedded instruction during EI home visits.

Home Visiting Measures

Several measures have been developed to examine the key components of EI home visiting. Studies included in this review used these measures (described below) to answer their research questions.

The *Natural Environments Rating Scale (NERS)* is a measure that was designed to evaluate child-focused intervention in which the child is engaged in an activity or routine in his/her natural environment. The *NERS* characterizes home visits as including eight categories: setting, activity, activity type, child engagement, activity leader, materials, caregiver role, and

provider role. To distinguish between child-focused and participation-based EI home visits, raters score the leader of the activity, materials used, role of the caregiver, and role of the provider. If the overall score is a 2 or below, the home visit is identified as traditional, child-focused. A score of 2.5 and above is classified as a participation-based home visit (Campbell & Sawyer, 2004).

The *NERS-Revised (NERS-R)* is an interval rating scale, and the frequency with which providers implement the seven teaching behaviors are coded every 30 seconds. The seven teaching behaviors (five purposeful and two incidental, respectively) are as follows: (a) “demonstration with narrative,” (b) “caregiver practice with feedback,” (c) “guided practice,” (d) “conversation and information sharing,” (e) “problem-oriented reflection,” (f) “provider working with child without explanation,” and (g) “joint interaction with child” (Sawyer & Campbell, 2017).

McBride and Peterson’s *Home Visit Observation Form (HVOF)* (1997) is a more comprehensive measure that evaluates the content covered within the triad and the provider processes implemented during home visits. A rater observes in situ and simultaneously rates four categories (individuals present, interaction partners, content of interaction, and the role of the provider) for a duration of 10 minutes followed by a 2-minute break and repeats the process until the end of the visit. Each category is then coded in 30-second intervals, and the behavior that occurred for the longest duration is coded (McBride & Peterson, 1997). The *HVOF-M* is the modified version of *HVOF* and includes an additional category: role of the caregiver (Wilcox & Lamorey, 2004). This measure was designed to be used to rate videotapes of home visits rather than in situ. Coding begins when the first child-focused activity or routine begins and continues for 40 30-second intervals or for 20 minutes. A total of 25 items are coded to identify the content addressed and the provider and caregiver behaviors that occurred during the EI home visit (Campbell & Sawyer, 2007; McBride & Peterson, 1997). The *HVOF-Revised* was designed

collaboratively between the investigators and an Early Head Start (EHS) program. Revisions were made to the tool's codes to reflect topics and behaviors that were unique to the EHS program (Peterson et al., 2007). Each category is coded simultaneously in 30-second intervals by an observer during a home visit (Peterson et al., 2007; Peterson et al., 2018).

The *Home Visit Rating Scales-Adapted & Extended (HVORSA+)* is an assessment tool designed for providers and supervisors who are seeking “high level of excellence” (Roggman et al., 2012). The measure assigns a quality rating by measuring home visiting practices and engagement. To establish a quality rating of implemented practices, observers take the average of scores across four domains: (1) “home visitor responsiveness to family,” (2) “home visitor relationship with family,” (3) “home visitor facilitation of parent-child interaction,” and (4) “home visitor non-intrusive collaboration” (Roggman et al., 2012, as cited in, Peterson, et al., 2018). To determine an overall quality rating of engagement, raters watch a home visit in its entirety and average the score across three domains: (1) “parent-child interaction,” (2) “parent engagement,” and (3) “child engagement.” These seven domains are scored on a scale of 1 (poor quality) to 7 (excellent quality) based on a scale of domain-specific behavioral markers (Peterson et al., 2018).

The *Fidelity of Implementation Checklist* (Woods et al., 2005) is a three-point ordinal scale that includes 18 home visiting process indicators. The checklist is used to rate the frequency with which providers implement coaching practices (Salisbury et al., 2012). The *Routine and Instructional Strategy Coding Protocol-IL* (Salisbury et al., 2008, as cited in Salisbury et al., 2012) included nine coaching strategies that reflected the teaching, learning, communication, and consultation literature. The protocol was used to evaluate collaborative consultation (coaching) during EI home visits. Later iterations were used to assess provider

implementation of coaching practices and caregiver engagement (Salisbury et al., 2012). Table 1 includes study methods associated with each measure and their strengths and limitations.

Table 1
Measures and Methods

Measure	Method	Strengths	Limitations	Researchers
<i>NERS</i>	Quantitative Descriptive	A holistic picture of a child-focused home visit with a triad	It only measures child-focused interventions, does not measure content of interaction	Campbell & Sawyer, 2004
<i>NERS – R</i>	Quantitative Descriptive	The last five categories make it possible to distinguish between child-focused and participation-based intervention. It can broadly describe the context of HVs. It also rates the frequency with which Ps implement teaching behaviors.	Does not measure the content of the interaction nor reciprocal behaviors among the triad	Campbell & Sawyer, 2008
<i>HVOF</i>	Quantitative Descriptive	To identify if providers were using family-centered practices by establishing the frequency with which providers interacted with or directly taught the C.	Ambiguous rating categories (i.e., “other content”) –a need to operationalize items, no examination of CG or C role	McBride & Peterson, 1993
<i>HVOF-M</i>	Quantitative Descriptive	A more comprehensive description of triadic interactions during home visits	Ambiguous rating categories – items should be operationalized	McBride & Peterson, 1997

<i>HVOF – R</i>	Quantitative Descriptive	Includes operationalized definitions of items (categories and subcategories), measures interaction partners, content of the interaction, and specific strategies implemented.	Does not measure reciprocal behaviors or transactions that occur within the triadic interaction. Revised tool was refined to reflect topics and behaviors specific to a single program. Not necessarily generalizable.	McBride & Peterson, 1996
<i>HOVRS A +</i>	Quantitative Observational	A comprehensive measure that assesses the engagement of all members of the triad and examines the provider's relationship with the family.	A subjective measure in which the observers make judgement calls and selects 1-7 to determine if he/she considers degree of quality for each domain category.	Roggman et al., 2012
Fidelity of Implementation Checklist	Quantitative Descriptive	18 process indicators – comprehensive, items are explicitly defined	Original checklist included items that reflected child-focused EI.	Woods et al., 2005
Routine and Instructional Strategy Coding Protocol-IL	Quantitative Descriptive	Item list of coaching strategies reflected teaching and communication behaviors and adult learning and consultation strategies. It also measures CG engagement.	Item list is not comprehensive - relatively short with nine items.	Salisbury et al., 2008

Interviews/Surveys	Quantitative	Understanding participants' perspectives, can provide insight as to why patterns occur	Qualitative interview responses can be subjective, developing questions should be unbiased and representative of the research questions and participants
	Qualitative		
	Descriptive		
	SCD		

HV = home visits; CG = caregiver; C = child; SCD = single-case design.

Analysis of Research on Home Visiting

The following is a synthesis of EI home visiting studies that have used a variety of measures to investigate components of home visiting. The purpose of this analysis was twofold: (a) to examine the existing measures used to capture the dynamic process of home visiting, and (b) to establish what the research revealed about how or if providers are implementing recommended practices that reflect the triadic approach during home visiting. Investigational studies that examined the process and practices of home visits were the primary focus of this analysis. Table 2 summarizes elements of key investigations.

Method

Investigational studies examining home visits were identified through a two-step process: (1) a search of the home visiting literature in the APA PsycINFO and ERIC on EBSCOhost databases and (2) a selection of studies that met the inclusion criteria for this literature review. Terms included in the database search were: (a) *early intervention home visits* and *home visiting practices*, *triadic early intervention*, *participation-based services*, *triadic interactions*, and *home visit rating scales*, and (b) *triadic early intervention rating scales*. The search produced 180 studies, and inclusion criteria guided the final selection of studies included in this review. Inclusion criteria were: (a) services and/or interventions were provided in the family's home, (b)

participants included member(s) of the triad (providers, caregivers, and children with disabilities), (c) measures assessed components of home visiting, and (d) triadic early intervention home visits in natural environments. Ten investigational studies examining home visits were selected based on the outlined criteria. Information from identified studies was summarized into six categories: (1) author(s), (2) aim of study, (3) design/method, (4) participant sample, (5) measure(s) used in the study, and (6) study findings (see Table 2).

Participant Characteristics

Participants included in the investigational studies were providers, caregivers, and/or children with disabilities. Ten studies involved all three triad members, while one study involved only providers. The total number of provider participants across the 13 studies was 561, and the total number of caregivers and children reported was 777 and 668, respectively. Most providers were White ($n = 76\%$) and female ($n = 95\%$). Most studies did not distinguish between the caregiver and their child's race or ethnicity, while ten studies explicitly reported the racial and ethnic composition of families. The majority of the families who participated in these studies were White. The second largest majority of families were Black followed by Latino/a or Hispanic, and the remaining participating families were Asian, Biracial, Native American, or Other. For the seven studies that included children in their investigations and reported the gender of child participants, 56% were boys and 44% were girls. Eight of the studies provided information regarding the child's disability, while two studies that involved children and documented some child demographics did not disclose their disabilities. Children's reported disabilities included, but were not limited to, developmental delays, Down syndrome, and autism.

Omitted demographic information did not allow for a complete review of study participants (e.g., Colyvas et al., 2010; Hughes-Belding et al., 2019; Peterson et al., 2018). A comprehensive report is important so that the field can better understand the effects of interventions on populations being served during EI home visits. This is also valuable information for improving the generalizability of the studies' findings. Demographic information for participants in each study is provided in Table 2.

Investigational Studies of EI Home Visiting

The body of literature on providers' approaches to home visiting and implementation of practices indicated that providers remain rooted in traditional, child-focused intervention. Three of the home visit studies examined providers' approach to EI home visiting (Campbell & Sawyer, 2007, 2009; Colyvas et al., 2010). In perhaps one of the leading examinations of providers' approach to EI home visiting, Campbell et al. (2007) used the *NERS* and found that providers were implementing traditional services 70% of the time and providing participation-based services in 30% of home visits. To examine interaction partners, content discussed during interactions, and provider and caregiver roles within both approaches of home visiting, the investigators used the *HVOF-M*. In the traditional home visits, caregiver-child interactions were observed only 2.39% of the time, while in participation-based home visits caregiver-child interactions were noted 17.46% of the time. Caregiver-child interactions more than doubled and caregiver involvement was more than seven times greater during participation-based home visits than during child-focused home visits, underscoring the significance of triadic intervention practices. However, it is important to note that Campbell & Sawyer's (2007) study required providers to submit only one videotaped example of a home visit with one family. Typical home visits are subject to a variety of unforeseen circumstances that can affect the behaviors of the

triad or influence components of the intervention session. More submissions of videotaped home visits would have allowed for a greater representation of intervention practices and likely resulted in more generalizable findings.

Sawyer and Campbell (2017) examined the frequency with which providers used purposeful teaching strategies during home visits using the *NERS-R*. Similar to other included studies in this review (e.g., Campbell & Sawyer 2007, 2009; McBride & Peterson, 1997; Peterson et al., 2007; Salisbury et al., 2012), Campbell & Sawyer (2017) found that providers did not implement purposeful teaching strategies with frequency despite participating in professional development. Provider guided practice was implemented in less than 1% of the observed intervals regardless of caregiver engagement, and provider demonstration with narration was observed only 2.20% of the time for caregivers who were considered to be very engaged (Campbell & Sawyer, 2017).

Studies that examined adult interactions, provider practices/strategies implemented, and/or provider-caregiver roles revealed that providers spent minimal time participating in triadic interactions and did not frequently implement coaching practices (e.g., McBride & Peterson, 1997; Peterson et al., 2007). McBride and Peterson (1997) evaluated processes employed by providers during EI home visits using the *HVOF* and found that providers were observing 7% of the time and modeling only .47% of the time. In a more recent study, Peterson et al. (2018) examined the characteristics and quality of home visits using the *HVOF-R* and *HVORSA+* and discovered that when providers and caregivers participated in triadic interactions, caregiver engagement increased. However, providers only spent 17% of their time participating in triadic interactions, and only 2% of that time was spent coaching caregivers. Other studies offer more promising findings suggesting that providers can adopt practices that are reflective of triadic

intervention. Cambray-Engstrom and Salisbury (2010) found that providers were child-focused for only 22% of observed intervals and attributed the low percentage to effective training and implementation support. Salisbury and Cushing (2013) evaluated provider and caregiver behaviors in both triadic and provider-led interactions using the *Routine and Instructional Strategy Coding Protocol*. Findings showed that providers participating in the triadic condition were far more likely to use recommended coaching practices and interact with the caregiver, and the caregiver was more likely to take the lead and focus on the child suggesting that both providers and caregivers are capable of adopting and implementing strategies as intended.

To build caregiver capacity and teach caregivers how to use caregiver-implemented intervention strategies and embed learning opportunities into authentic daily routines, it is essential caregivers become collaborative and engaged partners in the home visiting process. The four studies discussed here that primarily focused on caregiver participation or the quality of caregiver participation strongly indicated that when providers spent time in triadic interactions or used collaborative practices during the intervention session, caregivers tended to be more engaged during home visits (Cambray-Engstrom & Salisbury, 2010; Hughes-Belding et al., 2019; Sawyer & Campbell, 2017; Swanson et al., 2011). Sawyer and Campbell (2017) reported that 94% of the identified participation-based home visits involved caregivers. Hughes-Belding et al. (2019) examined the practices and extent of triadic engagement that resulted in quality home visits using the *HVOF-R* and the *HVORS*. Their findings showed that the more time providers and caregivers participated in triadic interactions, the greater the quality of family engagement during home visits.

Table 2*Home Visiting: Capacity Building, Caregiver-Implemented Intervention, and Embedded Instruction*

Author	Aim	Design/Method	Sample	Measure(s)	Findings
Brown & Woods 2015	An evaluation of a parent-implemented communication on CG and C communication	Multiple-baseline single-case design, quantitative	SLP = 4 Yrs. Ex. (<i>M</i>) = 5 M.A. = 75% PhD = 25% CG = 9 F = 100% HS = 11% 2-4 yr. degree = 56% Graduate degree = 33% C = 9 W = 78% B = 11% H = 11% M = 33% F = 67% DS = 3 ASD = 3 DD = 3	MSEL, PLS-4, MCDI, IGDI-ECI, The Observer XT 10	CGs demonstrated an increased use of modeling and responsiveness. C demonstrated increased use of targeted communication skills from baseline to intervention. Results suggested that the triadic approach was successful in parent-implemented communication intervention.
Brown & Woods, 2016	An exploration of the triadic relationship between the P, CG, and C in a parent-implemented communication intervention	Descriptive design, secondary data analysis, sequential analysis	P = 4 Yrs. Ex. (<i>M</i>) = 5 M.A. = 75% PhD = 25% CG = 9 F = 100% HS = 11% 2-4 yr. degree = 56% Graduate degree = 33% C = 9	IGDI-ECI	CGs were more likely to implement strategies during or after Ps use of coaching strategies that encouraged active CG participation. C communication targets increased after responsive C-CG interactions. P's use of CG "practice with feedback, observation, and guided practice with feedback" most frequently influenced CG use of strategies and increased CG participation.

			W = 78% B = 11% H = 11% M = 33% F = 67% DS = 3 ASD = 3 DD = 3		
Cambray-Engstrom & Salisbury, 2010	An examination of Latina mothers' participation in EI HVs when Ps used collaborative consultation strategies in the family's everyday activities	Descriptive design, exploratory case study	P = 4 L = 50% W = 25% B = 25% F = 100% M.A. = 100% Yrs. Ex. (<i>M</i>) = 5.67 CG = 10 L = 100% ≤ HS = 70% AA = 10% NR = 20% C = 10 L = 100% M = 50% F = 50% DD = 9 DS = 1	The Routine & Instructional Strategy Coding Protocol-IL	There was frequent implementation of collaborative strategies. When there were higher levels of CG participation, joint interaction was used more frequently. HVs in which CGs were less active and less involved resulted in more frequent child-focused interactions. Additionally, CG practice with feedback was strongly associated with CG participation during less active sessions.
Campbell & Sawyer, 2007	To identify and distinguish participation-based services from traditional services provided during HVs	Descriptive design, quantitative	P = 50 W = 72% F = 96% HS = 2% BA = 43% MA = 55% Yrs. Ex. (<i>M</i>) = 3.1 CG = 50 C = 50 W = 66%	<i>HVOF-M, NERS</i>	The <i>NERS</i> can be used to assess and describe participation-based characteristics. Furthermore, the study revealed that Ps implemented practices that reflected traditional, child-focus intervention during 70% of HVs, and Ps only implemented participation-based practices 30% of the time.

			B = 20% L = 14% Speech delay = 33% Motor delay = 33% Multiple disabilities = 33%		
Campbell & Sawyer, 2009	An examination to determine Ps' implementation of participation-based services during HVs	Quasi-experimental design, mixed methods	P = 96 W = 63% F = 96% AA = 3% BA = 40% MA = 51% PhD = 6% Yrs. Ex. (<i>M</i>) = 7.4 CG = 83 B = 43% W = 40% L/H = 16% O = 1% HS = 57% AA = 4% BA = 29% MA = 9% C = 83 M = 59% F = 41% DD = 56% SpD = 44%	<i>NERS</i> , Q-sort, self-guided reflective analysis written reports	The <i>NERS</i> results showed that Ps were implementing traditional, child-focused intervention 40% of the time and implementing participation-based services 60% of the time. Additionally, beliefs of Ps who implemented participation-based services more closely reflected recommended practices than those who implemented traditional intervention services.
Ciupe & Salisbury, 2020	To examine if CG coaching increased CG use of four development promoting behaviors and to examine if coaching practices impacted CGs' ability to take the lead and support C learning in daily activities	Multiple-baseline single-case design, secondary analysis	P = 1 W = 100% F = 100% Yrs. Ex. = 4 CG/C = 3 Biracial = 2 H = 1 DS = 1 Autism = 1	<i>PICCOLO</i>	CG coaching is related to CGs' increased use of teaching and responsiveness strategies and improved CG-C relationships through encouragement. Over the course of EI sessions, P implementation of coaching practices reduced which may have resulted in CGs taking the lead during HVs. It was also suggested that CGs initiations during EI sessions were likely associated with their increased ability to implement teaching strategies post intervention.

Colyvas et al., 2010	To examine occupational therapists' use of CG teaching strategies using the P-B approach versus the T approach	Descriptive design, secondary analysis	DD = 1	Teaching Caregivers Scale	Minimal explicit teaching occurred, and Ps did not consistently facilitate caregiver-child interactions whether they were implementing participation-based or traditional services. Traditional Ps were more likely to use modeling while the CG passively observed, and the participation-based Ps were more likely to use joint interaction with the CG and C.
			P = 31 W = 77% F = 90% CG = 32 C = 32 W = 40% B = 40% L = 13.3% O = 6.7% M = 56% F = 44% DD = 50% Cerebral palsy, DS, Prader-Willi = 50%		
Douglas et al., 2020	To examine the experiences, practices, and obstacles that EI Ps encountered as they coach caregivers	Descriptive design, mixed-methods	P = 19 W = 95% F = 100% BA = 11% MA = 84% PhD = 5% Yrs. Ex. 4-5 yrs. = 5% 6-10 yrs. = 21% 11-15 = 5% 15+ = 68%	Online questionnaire, phone interview, and online coaching logs	Ps reported that all coaching practices were important, used often, and beneficial for the triad. Some Ps suggested that pre-coaching strategies could help ease CGs who were unfamiliar with the CG coaching. The strategies ranked highest in importance were joint planning, observation, and action practices relative to reflection and feedback. For each strategy, ranking of importance was greater than actual use of strategies. The three strategies with the greatest discrepancies were observation, action, and reflection.
Fleming et al., 2011	To examine P's perspectives of actual and optimal use of participation-based practices and their understanding of gaps between expected use of practices and what they actually implemented	Descriptive design, mixed-methods	P = 31 W = 79% F = 90% AA = 4% BA = 25% MA = 64% PhD = 7% Yrs. Ex. (M) = 7.8	NERS, Semi-structured interview protocol	Ps, regardless of demonstrating traditional or participation-based services during HVs, did not entirely understand participation-based practices.

Hughes-Belding et al., 2019	To examine practices and engagement that foster high-quality home visiting	Descriptive design, quantitative	<p>P = 41 W = 87% F = 100%</p> <p>CG = 90 W = 88% F = 99% HS/GED or less = 68%</p>	<i>HVOF-R, HVORS</i>	Triadic interactions tended to focus on child-related content and reflected higher quality of family engagement during HVs. Time spent on adult-related interactions resulted in lower quality of family engagement as well as home visiting practices.
Kashinath et al., 2006	To examine the effects of CG use of teaching strategies on C communication outcomes	Single-case quantitative experimental design	<p>P (SLP) = 1 Yrs. Ex. = 3</p> <p>CG = 5 F = 100%</p> <p>C = 5 M = 80% F = 20% ASD = 100%</p>	MSEL, CSBS-DP	The frequency of strategy use was varied across CGs and across sessions, but all CGs demonstrated proficiency in implementing teaching strategies. All CGs generalized strategies across routines. Even though C outcomes increased during intervention, CG use of a second teaching strategy was only evident for 1 of the 5 CGs. All CGs reported a positive experience during intervention and positive outcomes for the C.
McBride & Peterson, 1997	To observe and describe the Ps' EI process, content addressed, and processes used during HVs	Descriptive design, mixed-methods	<p>P = 15 W = 100% F = 100% Yrs. Ex. (M) = 8</p> <p>CG = 28 Ed. Mother: >HS = 11% HS/GED = 29% ST = 39% BA = 21% Father: >HS = 11% HS/GED = 36% ST = 32% BA = 14% MA = 7%</p> <p>C = 28</p>	<i>HVOF</i> , provider self-report, provider, and family interviews	Traditional, child-focused intervention was the most implemented. The greater the needs of the child, the more likely the P took the role of observer. Ps spent nearly half their time during HVs in joint interaction with the CG and C, but only 3% of the time was the CG interacting with the C. Ps spent approximately half the time directly teaching the child, a fourth of the time was spent sharing information, and 7% listening, 7% observing, and only .47% modeling.

			W = 93% B/H = 7% M = 61% F = 39% SpD = 64% No SpD = 36%		
Meadan et al., 2016	To examine whether a training and coaching program taught mothers how to use a tele-practice service delivery model to implement teaching strategies to teach C communication skills	Single-case experimental design, quantitative	P = 2 CG-C = 3 W = 66% Middle Eastern = 33% F = 100%	Fidelity of implementation checklist, self-report forms, interviews	CGs learned to use naturalistic teaching strategies when coached via Skype, and CG implementation of strategies were linked to positive changes in C communication skills. This study argued that the barriers are P travel and the intensity of EI dosage, which are alleviated when coaching is delivered via the Internet.
Peterson, et al., 2007	To explore the overall EI process and describe specific strategies Ps used in the triadic approach	Descriptive design, quantitative	P = 61 W = 100% F = 98% BA = 95% Yrs. Ex. (M) = 5 CG = 120 W = 84% B = 3% H = 6% O = 6% NR = 1% F = 99% NR = 2% ≤HS = 56% AA = 28% ≥BA = 13% NR = 3% C = 120 M = 53% F = 47%	HVOF and HVOF-R	Minimal time was spent promoting CG-C interactions and building caregiver-capacity by means of coaching, promoting CG-C interactions, or modeling. When Ps did implement coaching strategies, CGs were more likely to be engaged. Families' experience receiving services did not align with expected program goals. Even though EHS and Part C programs goals emphasized the importance of supporting CG-C interactions, most of Ps' time was spent directly teaching the child.

Peterson et al., 2018	To examine triadic interactions as they occurred during HVs with an emphasis on characteristics and quality of HVs by measuring the time spent in triadic interactions, time spent coaching positive CG-C interactions, and Ps' use of evidence-based practices (observation, modeling, and coaching)	Descriptive design, quantitative	<p>P = 45 W = 89% F = 100% BA < = 89% Yrs. Ex. = 1+</p> <p>CG = 108 W = 65% B/A/NA = 11% Biracial = 24% Ed. < HS = 13% HS/GED = 44% Some college = 43%</p> <p>C = 108 M = 53% F = 47%</p>	<i>HVOF-R, HOVRS A+</i>	<p>Home visitors spent approximately 75% of their time interacting with CGs and only 17% of their time in triadic interactions. On average, only 2% of each HV was spent on coaching CG-C interactions. 15% of the time spent in triadic interactions was spent on observing CG-C interactions (8%) and modeling for the CG (7%).</p> <p>Quality ratings: HV practices ($r = .30$) and engagement ($r = .13$)</p> <p>Time spent observing and modeling did not predict the quality of practices during HVs. However, the time spent observing, modeling, and coaching did predict engagement quality.</p>
Roberts & Kaiser, 2012	To examine the extent to which CG-implemented communication strategies improved language skills in toddlers who were at risk for language delays vs. typically developing toddlers	Comparative, randomized group design, quantitative	<p>CG = 62 F = 89% M = 11%</p> <p>C = 62 M = 85% F = 15%</p> <p>W = 79% B = 15% A = 5% O = 1% LI = 100%</p>	Bayley-III, PLS-4	Caregiver-implemented intervention/EMT was an effective approach for supporting children with language impairments. CG and Cs who received intervention demonstrated higher levels of receptive and expressive language than those who did not receive intervention. CGs were capable of learning new and effective strategies that promoted C language skills.
Salisbury et al., 2010	To examine Ps' perspectives and experiences on employing a collaborative consultation practices during the Chicago Early Intervention Project (CEIP) HVs	Exploratory case study method	<p>P = 6 W = 50% B = 17% H = 33 F = 83% M = 17%</p> <p>CG = 68 L = 49%</p>	<i>Stages of Concern Questionnaire</i> (SoCQ), semi-structured interviews, and focus group	P concerns regarding collaborative consultation and routines-based, family-centered home visits diminished posttest. Ps expressed that this was because of the organization's culture and the ongoing administrative support they received. They also attributed their adoption of family-centered practices to having sufficient opportunities for practice and for problem solving

			B = 30% W = 13% A/O = 8% C = 68 M = 66% F = 33% DD = 76% Neuro/ sensory disabilities = .1% DS or autism = 14%		with feedback. They expressed that the consultative approach was challenging.
Salisbury et al., 2012	An examination of coaching strategies Ps used during EI HVs, and P reported use of strategies vs. actual use of strategies	Descriptive design, exploratory case study method	P = 6 W = 50% F = 83% M = 17% MA or > = 100% CG = 21 H = 66% W = 19% B/A = 15% C = 21 H = 66% W = 5% B or A = 31% Gender = NR DD = 90% Neuro or chromosomal disabilities = 10%	Fidelity of Implementation Checklist (9 coaching strategies were selected), The Routine and Instructional Strategy Coding Protocol, and contact note form	Five of the six Ps used the checklist with 77% fidelity, and the sixth P with 34% fidelity. Each P used all strategies at least once during one of the 90 HVs. Contact note data showed there was consistent underreporting of strategy use. Conversation/information-sharing and JI were the most frequently used strategies. Child-focused interactions were observed 12.64% of the intervals coded, and problem solving occurred less than 1% of the intervals coded.
Salisbury & Cushing, 2013	A comparative analysis of P and CG actions in triadic (TRI) and provider-led (PL) interactions: who was the lead (form), most frequently implemented intervention practice (function), and who did the adults focus on (focus)	Two-group comparative design, quantitative	P = 6 W = 67% H = 33% F = 83% M = 17% CG = 17 L = 71% F = 82% M = 18%	Routine and Instructional Strategy Coding Protocol (Modified)	Ps adhered to the parameters of each condition. Ps lead: PL = 75% and TRI = 44% of the time. JI: PL = 20% and TRI = 47% CG lead: PL = 5% and TRI = 9% Direct teaching for P: PL = 75% and TRI = 67% Setting the Stage: PL = 4% and TRI = 8% CGs working with C: PL = 2% and TRI = 7% P focus on CG: PL = 12% and TRI = 22% P focus on C: PL = 76% and TRI = 34% CG focus on C: PL = 3% and TRI = 8%

			C = 17 M = 71% F = 29% DD = 100%		
Salisbury et al., 2017	An exploration of CGs and Ps experiences and views of the EPIC approach: SOOPR coaching practices, the 5Q framework, front loading, VM, and its website	Descriptive phenomenological and collective case study	P = 11 W = 91% H = 9% F = 100% MA or PhD = 100% Yrs. Ex. (<i>M</i>) = 13.7 CG = 19 F = 100% W = 48% Biracial = 16% H = 26% A = 5% NA = 5% HS/GED = 16% Some college = 32% BA = 47% NR = 5%	Interview protocol, caregiver feedback survey	Both Ps and CGs reported the SOOPR coaching process to be positive and effective for building caregiver capacity regarding embedded instruction. However, CG coaching was still perceived to be challenging. Both Ps and CGs reported the 5Q to be a helpful framework for supporting CGs to identify learning opportunities. CGs expressed that making decisions and working as a triad were important components to building their knowledge and skillset.
Sawyer & Campbell, 2017	To examine P use of specific and intentional teaching behaviors and triad characteristics that might influence teaching during EI HVs	Correlational design, quantitative	P = 162 W = 70% B = 19% A = 7% O = 4% F = 93% M = 7% AA = 2% BA = 40% MA = 52% PhD = 6% Yrs. Ex. (<i>M</i>) = 9.9 CG = 162 W = 42% B = 41% L/H = 11% A = 1%	<i>NERS-Revised</i>	Results showed that 95 of the HVs observed were identified as traditional and 170 were identified as participation-based. CGs were rated as being engaged in 94% of HVs that were participation-based. However, the implementation of purposeful teaching strategies was infrequent but were more likely when the CG was engaged.

			Not specified = 4% < HS = 5% ≤ HS = 12% AA = 12% BA = 27% Grad. degree = 10% C = 162 M = 56% F = 44% DD = 47% ASD = 5% DS = 6% Cerebral Palsy = 7% Visual/hearing impairment = 10% O = 24%		
Swanson et al., 2011	An examination of how the capacity-building approach improved caregivers' capacity to support their children with disabilities	Multiple baseline single case design, quantitative	P = 1 CG = 4 F = 100% AA = 75% 11 th grade = 25% C = 4 M = 75% F = 25% DD = 100%	Parent Behavior Rating Scale, Parenting Confidence and Efficacy Scale	Capacity-building practices built CG competence and enhanced the family's ability to support their child in authentic, daily routines. CGs interactional behaviors and their confidence increased after working with Ps during EI home visits. CG participation was critical for them to learn and adopt new strategies. CGs expressed that it was particularly helpful when the P encouraged them to ask questions, modeled practices, created opportunities for CGs to practice newly learned strategies, and when the P helped CGs make decisions during the HV.
Windsor et al., 2019	An examination of the effects of coaching CGs on CGs' embedding communication and motor goals in the C's daily activities/routines using EMT strategies	Single case design, quantitative	P = 1 F = 100% PhD Yrs. Ex. = 3 CG = 3 HS = 33% Some college = 33% BA = 33% C = 3	ABILITIES Index, MSEL, IGDI-EMI, The AEPS-Second Edition	CGs were capable of learning how to embed learning opportunities using EMT strategies. Promoting C communication and motor skills within a single routine could increase the C's engagement. Also, the implementation of EMT strategies immediately increased the CG's ability to embed intervention.

W = 100%
M = 66%
F = 33%
DS = 66%
MSD/VI = 33%

Note. P = provider; CG = caregiver; C = child; M = male; F = female; W = White; B = Black; L = Latino/a; H = Hispanic; A = Asian; NA = Native American; Mr. = Multiracial; HS = high school; AA = associates degree; ST = secondary training; BA = bachelor's degree; MA = master's degree; Yrs. Ex. = years' experience; HV = home visits; NR = not reported; DD = developmental delays; DS = Down syndrome; ASD = autism spectrum disorder; SpD = specific disability; LI = language impairment; VI = visual impairment; MSD = Microcephaly Seizure Disorder; *HVOF* (M) (R) = Home Visit Observation Form (Modified) (Revised); *NERS* = Natural Environments Rating Scale; MSEL = Mullen Scales of Early Learning; PLS = Preschool Language Scale; MCDI = MacArthur Communication Development Index; IDGIs = Individual Growth and Development Indicators of Early Literacy; AEPS = Assessment, Evaluation, and Programming System; FGRBI = Family Guided Routines-Based Intervention; JI = joint interaction; EMT = enhanced milieu teaching; SLP = speech language pathologist; LO = learning opportunities; EPIC = *Embedded Practices and Intervention with Caregivers*; VM = Visual Model.

Critique of Extant Measures, Designs, and Methods

The current home visiting literature emphasizes the importance of building caregiver capacity and improving caregiver-child interactions as a means of promoting child learning during home visits. Researchers have developed measures and conducted studies to explore aspects of complex and dynamic processes (i.e., embedded instruction, capacity building, and caregiver-implemented intervention) and/or relationships (i.e., the triad) that are expected to occur during EI home visits. These studies help to provide a more comprehensive understanding of how professionals can support families and their children with disabilities in their natural environments. While each of the included studies produced findings that contribute to the field's understanding of EI home visits, an analysis of how the studies were conducted was necessary to establish the depth of the extant research base, and potentially inform future data collection and measure refinement. The following section will: (a) provide an analysis of home visiting measures employed to assess EI home visits, and (b) summarize and analyze the designs and methods used in the included studies.

Analysis of Home Visiting Measures

Investigators have used rating scales (e.g., Campbell & Sawyer, 2007, 2009; Colyvas et al., 2010; Peterson et al., 2018) and checklists and protocols (e.g., Cambray-Engstrom & Salisbury, 2010; Ciupe & Salisbury, 2020; Peterson et al., 2007) to evaluate provider practices, identify interaction partners, and assess content discussed in adult interactions. Most studies supplemented measures with surveys, questionnaires, self-reports, and/or interviews (e.g., Campbell & Sawyer, 2009; Fleming et al., 2011; McBride & Peterson, 1997) or used an additional measure (e.g., Campbell & Sawyer, 2007; Hughes-Belding et al., 2019) to obtain

information about participants' experiences in their home visiting sessions and/or perspectives of home visiting components.

Limitations of Home Visiting Measures. The most frequently cited measures used to evaluate home visits were the *NERS* and the *HVOF* and their modified and revised versions. As evident in Table 1, measures needed to be modified and revised to meet the needs of intervention paradigm shifts and evolving practices. The *NERS* was originally designed to rate the implementation of traditional, child-focused interventions (Campbell & Sawyer, 2007). Exclusively examining child-focused interventions was limiting and no longer sufficient for evaluating home visits that should reflect current recommended practices. Therefore, it was necessary for Campbell and Sawyer (2008) to revise the *NERS* to include categories that measure participation-based practices. The *NERS-R* allowed for observers to rate provider teaching behaviors as they occurred during participation-based home visits, but the measure still did not assess content addressed in adult interactions. Without examining provider-caregiver interactions, there is no way of knowing if providers and caregivers are engaged in relevant dialogue and if either adult is responsive to the other during home visits.

The *HVOF* was designed to record the content discussed and practices implemented during home visits (McBride & Peterson, 1993), and its modified version (*HVOF-M*) addresses the role of the caregiver. However, neither version captures the reciprocal nature of adult interactions. For example, the item "interventionist directly refocuses parent attention to child or tries to involve sibling or others to be involved in the interaction" (McBride & Peterson, 1996) can add depth to the field's understanding of what occurs during home visits, but the measure does not document whether the caregiver (parent) responds to the providers' efforts. Consequently, the content item is viewed as unidirectional rather than reciprocal, and it is not

possible to make an accurate assessment of whether the interaction was constructive or effective. Reorganizing the instrument's format and/or coding procedures or operationalizing items to reflect responsive behaviors can allow researchers to measure the impact of specific coaching strategies. If an instrument can measure responsive behaviors, or sequences of behaviors that occur within an interaction, study findings can reveal the strengths and weaknesses of triadic interactions and can be used to improve and prioritize provider practices. The *HVOF-Revised* (McBride & Peterson, 1996) was used to measure interaction partners and the content of adult interactions during home visits, but it also has its limitations. While the revised version of this measure was extensive, with 24 items illustrating the content of interactions, items were tailored to meet the specific needs of their study program participants (Early Head Start) and cannot be generalized across home visiting programs.

The *Routine and Instructional Strategy Protocol* (Salisbury et al., 2008) is another measure that evaluates interaction partners and what occurs during the interaction, but reciprocity is not measured, posing the same issue as the *HVOF-R*. Researchers conducting experimental studies collected data using frequency measures to assess provider implementation of strategies, caregiver use of teaching strategies, and child communication outcomes (Kashinath et al., 2006; Meadan et al., 2016). These measures are quantitative and are often used to examine behaviors that are associated with capacity building, caregiver-implemented intervention, and embedded instruction. However, none of the identified measures reports the transactional and reciprocal nature of triadic interactions that should occur within each approach.

Studies often included supplemental measures, such as surveys and interviews, to support descriptive and experimental research. For example, Kashinath et al. (2006) collected a caregiver satisfaction survey, or questionnaire, to gather caregiver feedback about the provided

intervention and establish the intervention's social validity. Caregivers expressed that they were very satisfied with the intervention, suggesting that the intervention was socially relevant and impacted child outcomes. This type of research is generally used to generate patterns and provide information that describes participants' perceptions and validates the success of an intervention (Creswell, 2012). Although the body of home visiting research has contributed to the field's understanding of adult behaviors and the content discussed during adult interactions, existing measures are only capturing unidirectional behaviors. Interactions are inherently reciprocal, and therefore, should be measured in such a way that sequences in which provider-caregiver or caregiver-provider behaviors occur can be identified.

Analysis of Research Designs and Methods

Descriptive Research. Descriptive research was the most commonly applied research design of the included studies in this review. Descriptive research is often used when the investigator's intent is to: (a) describe characteristics of a population or topic, (b) record the frequency with which something occurs, (c) identify associations between variables, or (d) answer questions about ongoing events (Dulock, 1993). In the reviewed studies, frequently used methods for collecting data included case studies (e.g., Cambray-Engstrom & Salisbury, 2010; Salisbury et al., 2017), mixed-methods (e.g., Douglas et al., 2020; Fleming et al., 2011; McBride & Peterson et al., 1997), and secondary analysis of extracted data of videotaped intervention sessions from a previous study (Brown & Woods, 2016; Colyvas et al., 2010). Cambray-Engstrom and Salisbury (2010) examined providers' implementation of collaborative EI strategies in relation to Latina mothers' participation during home visits over a six-month period. They argued that provider practices and caregiver participation were subject to change within and across home-visits and that there was a need for studies that explored these variations over

time. Case studies allow the researcher to investigate events over time, in detail, in one or more participants (Creswell, 2013); and therefore, this method was suitable for examining their particular research questions.

The majority of the descriptive studies were conducted using mixed-methods. To offer an in-depth understanding of provider perspectives on caregiver coaching during home visits, Douglas et al. (2020) employed a mixed-methods design. Providers were asked to respond to an online questionnaire, participate in a phone interview, and record coaching logs. Each were analyzed separately and then aggregated for a ‘triangulation of data’ for the most comprehensive results (Douglas et al., 2020). Most studies that used the measures developed to assess components of home visiting (e.g., *NERS*, *HVOF*, etc.) either supplemented these measures with another tool or a qualitative approach, such as interviews or self-reports, to gain a more exhaustive understanding of a phenomenon (Bryman, 2006; Creswell & Plano Clark, 2011, as cited in Douglas et al., 2020).

Two of the included descriptive studies involved secondary analysis of videotaped home visits from a previous study (Brown & Woods, 2016; Colyvas et al., 2010). Because the dataset was not specifically designed for the research questions that guided these studies, significant variables may have been excluded. It is recommended that investigators know where the secondary data originated and how well it captures the details needed for their research (Cole & Trinh, 2017). Brown and Woods (2016) used data from their previous study conducted the year prior, and therefore were familiar with their data. However, Colyvas et al. (2010), randomly selected archival videotape data to examine providers’ teaching interactions during participation-based intervention versus traditional interventions. Without having a thorough understanding of

the data's history, it is not possible to know if the data is suitable for answering the specific research questions.

Multiple-Baseline Single-Case Design (SCD). One-fourth of the included studies involved multiple-baseline, SCD. When using SCD, it is important to consider instrumentation and fidelity to ensure that study findings are valid and reliable (Gast, 2010). Meadan et al. (2016) examined the impacts of training and coaching caregivers via videoconferencing on caregiver-implementation of naturalistic teaching strategies and how caregiver teaching strategies supported child communication skills. Meadan and colleagues (2016) trained caregivers to use target strategies at the same time and then delivered coaching in a staggered fashion. Coaching seemed to have impact on caregivers' performance, but the investigators did not examine caregiver performance after training which took place before the coaching phase. Consequently, findings could not solely be attributed to the caregiver coaching phase of the study. The investigators were not able to distinguish between the utility of training versus coaching, highlighting the importance and potential effect of phase sequences in SCD on study results.

Ciube & Salisbury's (2020) SCD concurrent multiple baseline study involved one provider and three dyads who participated in baseline, intervention, and maintenance phases to determine whether coaching strategies increased caregivers' initiation of four development-promoting behaviors. In contrast to the Meadan et al. (2016) study, data were collected following each of the three phases making it possible to accurately determine whether coaching behaviors that were introduced during the intervention impacted caregiver initiation of behaviors, emphasizing the importance of data collection during each phase of SCD.

Kashinath et al. (2006) also used SCD to examine caregiver use of teaching strategies with children during home visits. Caregivers were introduced to teaching strategies in a staggered fashion. Once researchers confirmed, via observation of video, the caregivers' ability to implement a teaching strategy for three consecutive sessions, a new strategy was introduced. A multiple-baseline design allowed researchers to examine the caregivers' implementation of strategies and their impact on child outcomes without having to withdraw the intervention (Gast, 2010). Kashinath et al. (2006) disclosed that study participants enrolled in center-based programs during intervention were unable to control for maturation and history. Specifically, investigators were not able to regulate the child's communication partners outside of the intervention, nor would doing so have been ethical. Other communication partners most likely impacted child communication development, which diminishes confidence in the reported effects of the intervention. External threats to validity are common in SCD studies (Gast, 2010).

Research Gaps

Over the past few decades, there has been a paradigm shift from child-focused EI to family-centered, triadic intervention. Researchers have focused on examining providers' approaches to EI home visits and have evaluated the unidirectional relationships of adult behaviors, but none of the studies mentioned above examined the reciprocal nature of adult interactions. To conduct these types of investigations, researchers have developed an array of tools to capture and examine various components of home visiting. Most of these tools have gone through a series of revisions and modifications to account for the evolution of recommended practices and to address shortcomings in the original versions. Studies in which these tools were used have established that providers are not consistently implementing evidence-based, recommended practices as intended during home visits, but there is a *need to*

examine reciprocal adult behaviors within triadic interactions to determine if the interactions truly reflect the kind of productive exchanges that impact and support caregiver and child outcomes. No studies could be located that examined sequential associations between specific provider and caregiver behaviors as they occur within triadic intervention home visits. Brown and Woods (2016) identified specific provider coaching strategies (e.g., practice with feedback, observation, etc.) that promoted caregiver engagement and general use of caregiver-implemented intervention strategies, but the investigators did not identify the specific caregiver behaviors that were elicited. To improve the way in which practices are delivered during home visits, there is a need to identify sequences of adult behaviors, or combinations of provider-caregiver instructional strategies, in order to better understand the associations between specific behaviors.

Further, very few studies could be located that examined how adult behaviors changed over time. Cambray-Engstrom and Salisbury's 2010 study mentioned in the preceding section the need for examining how adult behaviors change over time, pointing out that very few studies have addressed this dimension. Evaluating if and how behaviors progressed over the course of intervention sessions might provide additional insight into how providers may perhaps introduce coaching practices and/or prioritize practices at certain stages of the intervention process and whether caregivers are adopting strategies as intended. The research emphasizes the significant impact of quality triadic interactions for building capacity, caregiver implemented intervention, and embedded instruction, but only unidirectional behaviors were measured in the included studies. This was likely a result of the measures' limited abilities to capture reciprocal adult behaviors. Additional research, and new measures, are needed to delve into what occurs within adult interactions. Identifying specific provider behaviors that promote caregiver adoption of

development-promoting behaviors can influence how the field prioritizes, and how providers implement, evidence-based practices during EI home visits.

III. METHOD

Study Design

The primary aim of this study was to revise the original *TIERS* to better capture a thick description of adult transactional interactions that occurred during triadic intervention home visits. A secondary aim was to determine the utility of the *TIERS-R* for evaluating transactional changes in adult interactions over time. A four-phase development and evaluation process (Creswell et al., 2011) was followed to: (a) conduct an initial revision of the content and format of the original *TIERS*; (b) validate the content and format using input from experts in EI and revise accordingly; (c) test the feasibility of the *TIERS-R* and revise as needed; and (d) evaluate the appeal, function, and utility of the *TIERS-R*.

Two sets of observable behaviors presumed to be impacted by sequential adult interactions (IV) during EI sessions served as dependent variables [DV] in this study: (a) provider use of specific coaching practices [DV1], and (b) caregiver use of embedded teaching practices and Enhanced Milieu Teaching (EMT) practices [DV2]. Feedback from experts, practitioners, and raters was used during the revision process to assess the feasibility (ease of use) and utility (ability to identify adult behaviors as they occurred during triadic intervention), as well as the perceived relevance of the *TIERS-R* for measuring the nature and changes in adult interactions over the course of the intervention process.

Participants

Research participants in this study involved four groups of individuals: (a) six faculty/researchers in the field of EI who evaluated the content and format of the *TIERS-Revised* (*TIERS-R*) draft, (b) five practitioners with experience in caregiver coaching/routines-based intervention who also evaluated the content and format of the *TIERS-R* draft and who provided a

preliminary evaluation of the utility and appeal of the *TIERS-R* during the feasibility testing of the tool, (c) two graduate student raters who coded randomly selected videotapes of triadic EI home visit sessions using the *TIERS-R* in a small-scale evaluation of the tool, and (d) caregiver-child dyads represented in the EI home visit videotapes.

Expert Panel

The expert panel included six researchers with published work in the field of EI and/or assessment development, as well as five practitioners who had a minimum of five years' experience with routines-based intervention and/or caregiver coaching in EI home-based settings. The six faculty/researchers and the five practitioners are collectively referred to, herein, as the expert panel. The demographics of these individuals are included in Table 3. Each expert, depending on their professional backgrounds, was sent a "Faculty/Researcher Participation Packet" or a "Practitioner Participation Packet" (see Appendix A) via email and asked to review the included items: (1) a "Letter of Invitation" describing the purpose of the study, roles and responsibilities of participants, and researcher contact information, (2) an abstract summarizing the process of conceptual and structural revisions of the *TIERS*, and (3) an approved IRB describing the specifics of the study (see Appendix I). All members of the expert panel were asked to complete three activities: (a) sign a consent form and complete a demographic survey, (b) review the *TIERS-R*, and (c) complete the *Content Validation Form (CVF)* by rating the instrument's item clarity and relevance. The five consented practitioners participated alongside the six research/faculty participants in doing an initial review of the *TIERS-R* items, format, and coding procedures. The practitioners were also asked to complete an additional, fourth activity, a feasibility test of the tool in which they: (a) reviewed the second iteration of the *TIERS-R* and its accompanying materials (i.e., the *TIERS-R* coding form and *TIERS-R* administration manual),

(b) participated in a one-on-one Zoom meeting with the researcher to discuss *TIERS-R* items and procedures, (c) coded two, 10-minute segments of a play routine and a caregiving routine using *TIERS-R* and its materials, and (d) completed the *User Feedback Survey (UFS)* to share their experience using the *TIERS-R*.

Table 3*Sociodemographic Characteristics of Expert Panelists*

Characteristics	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11
Panelist' role	F/R	F/R	F/R	F/R	F/R	F/R	PR	PR	PR	PR	PR
Race/Ethnicity	W	W	W	W	W	W	W	W	W	B	Other
Language(s)	ENG	ENG	ENG	ENG	ENG	ENG	ENG ROM	ENG	ENG	ENG	ENG
Age (years)	50 +	50 +	50 +	31-50	50 +	31-50	31-50	31-50	50 +	31-50	31-50
Education level	PhD	PhD	PhD	PhD	PhD	PhD	PhD	M.A.	M.A.	M.A.	M.A.
Current Work Position	F/R and Speech EI P	F/R	F/R	N/A	F/R	F/R	BCBA and CS	DT	SLP and R	SD and C	OT
Provided services setting	HB, CB	HB, CB EHS, YMCA	HB, CB	HB, CB	HB, CB, HS	HB, CB	HB	HB, CB	HB, CB	HB, CB	HB, CB, POC
Current time spent (hrs.)	N/A	N/A	N/A	N/A	N/A	N/A	9	5	13	N/A	N/A
Years' experience	10 +	10 +	10 +	10 +	10 +	5-10	10 +	10 +	10 +	10 +	10 +

Note. P = provider; F/R = faculty/researcher; PR = practitioner; W = White; B = Black; ENG = English; ROM = Romanian; BCBA = Board Certified Behavior Analyst; CS = clinical supervisor; DT = developmental therapist; SLP = speech language pathologist; SD = staff development; C = coach; OT = occupational therapist; HB = home-based; CB = center-based; EHS = Early Head Start; HS = Head Start; POC = private outpatient clinic.

Videotape Raters

The two raters participating in a small-scale evaluation of the *TIERS-R* included one PhD graduate in special education and one math and science education PhD student. Their role was to use the *TIERS-R*, its coding form, and the administration manual to code videotaped segments of play and caregiving routines as they occur during triadic home visits and then provide evaluative feedback sharing their experience using the newly revised tool. Raters participated in a rigorous training session of the *TIERS-R*, collectively coded 63, 10-minute video segments of play and caregiving routines, participated in bi-weekly training booster sessions, and completed the *User Feedback Survey* once coding was completed.

Caregiver-Child Dyads

Videotaped segments of the four dyads comprising EIPC's SCD study were analyzed to evaluate the *TIERS-R*. Table 4 includes demographic information for the four dyads.

Dyad 1. Caregiver 1 was a biracial mother of two boys. She was married, had a graduate degree and a full-time job. She frequently communicated verbally with her child and was responsive to his vocalizations and needs but did not consistently encourage him to use expressive language. She often held her child and her parenting style could be characterized as "hovering" or "very involved" often preventing her child from sufficient learning opportunities. Child 1 was a 12-month-old boy who had Down syndrome. He evidenced delays in expressive communication and gross and fine motor skills. The child's communication goal was to improve on his expressive language by signing (e.g., more, all done) and reaching and/or pointing for objects he wanted or needed. His gross motor goal focused on improving his overall mobility. Specifically, his goal was to independently maintain a four-point kneel for a given amount of

time (in seconds) in preparation for crawling. His fine motor goal was to feed himself during mealtime.

Dyad 2. Caregiver 2 was a biracial mother of two boys. She was married and stayed at home. She did not demonstrate consistent verbal or physical interactions with her child who evidenced significant delays in expressive language and minor delays in fine motor development. Child 2 was a 30-month-old boy who was diagnosed with autism spectrum disorder (ASD). He was echolalic, exhibited repetitive behaviors, often participated in independent play, and would occasionally have outbursts. His communication goal was to appropriately use spontaneous language with his interaction partners. To enhance his fine motor skills, he traced letters and shapes using chalk on a chalkboard and markers on construction paper.

Dyad 3. Caregiver 3 was a Hispanic mother of one boy. She was married and went to school part-time. She was bilingual and spoke to her son in both Spanish, the family's first language, and English. She consistently engaged with her child during play and mealtime but did not focus on encouraging him to verbally express his wants and needs. Child 3 was a 24-month-old boy who evidenced developmental delays in the communication and motor domains. He had limited expressive language and mostly pointed and/or made incoherent vocalizations to communicate. To enhance his expressive language, his goal was to imitate one- to two-word phrases. He had significant delays in gross motor skills and would either crawl or walk with support from his mother or a walker to get from one place to the next. To increase his mobility, his goal was to stand independently and/or to take a minimum of two steps without assistance.

Dyad 4. Caregiver 4 was a Hispanic, married mother of two boys who worked full-time. She was bilingual and would speak Spanish, the family's first language, and English when communicating with her child. She frequently used directive, or instructional statements to

communicate with her child, fed the child, and limited the spaces in the apartment that the child could explore. Child 4 was 22-month-old boy who had Down syndrome. He was significantly delayed in expressive communication. The caregiver chose to focus on signing as a means for him to express his wants and needs during play and caregiving routines. He exhibited delays in fine motor development, and the caregiver wanted to focus on improving his self-feeding skills.

Table 4*Sociodemographic Characteristics of Videotaped Participants*

Characteristics	Dyad 1	Dyad 2	Dyad 3	Dyad 4
Caregiver				
Age in years	44	29	21	40
Gender	Female	Female	Female	Female
Ethnicity	White	Biracial	Hispanic	Hispanic
Education level	Graduate degree	College degree	High school	High school
Work status	Full time	Stay-at-home	Stay-at-home	Full time
Family income	>\$100,000	\$20-30,000	\$20-30,000	Declined
Child				
Age in months	12	30	24	22
Gender	Male	Male	Male	Male
Ethnicity	Biracial	Biracial	Hispanic	Hispanic
Language spoken	English	English	Spanish/English	Spanish/English
Diagnosis	DS	ASD	DD	DS
IGDI-ECI	4.00 (3.30)	15.60 (16.00)	4.66 (11.80)	4.00 (10.00)
Weighted total communication rate/min				
IGDI-EMI				
Total raw score	0.83 (4.00)	7 (13.00)	5.83 (10.50)	8.66 (9.00)
rate/min				

Note. Average normed rates are presented in parentheses. DS = Down syndrome; ASD = autism spectrum disorder; DD = developmental delay; IGDI = Infant Growth and Development Indicator; ECI = Early Communication Indicator; EMI = Early Movement Indicator.

Measures

Base Measure – Original TIERS.

The original *TIERS* (Basu, 2007) served as the base measure for this study. Table 5 reflects the original structure and content of the scale.

Table 5
Original TIERS

Did the provider...	Almost Always	Some times	Never	No Opportunity
Observing/Information Sharing				
Let parent make decisions about what to do during session	3	2	1	N
Maintain a position that would not interfere with the parent-child interaction?	3	2	1	N
Listen to what the caregiver says	3	2	1	N
Joint Interaction and Problem Solving				
Observe on-going interactions and provide feedback	3	2	1	N
Ask questions about routines, use of strategies, or the child's actions	3	2	1	N
Use/expand parent ideas during the session	3	2	1	N
Comment on specific strategies that are working well?	3	2	1	N
Ask for parent input and feedback on what is observed	3	2	1	N
Connect skills being learning in current routines to other routines	3	2	1	N
Practice with Feedback and Reflection				
Arrange environment to promote caregiver-child interaction	3	2	1	N
Interact with the caregiver and child as a dyad, rather than separately	3	2	1	N
Create/maintain opportunities for caregiver and child to interact	3	2	1	N
Engage caregiver and child in activities that are relevant	3	2	1	N
Allow sufficient time for caregiver to practice strategies	3	2	1	N
Engage caregiver and child in more than one activity	3	2	1	N
Explain how embedding strategies in daily routines helps child's development	3	2	1	N
Direct Teaching and Guided Practice				
Explicitly teach a strategy to the caregiver	3	2	1	N
Answer caregiver concerns	3	2	1	N
Suggest things to do with the child within and outside the intervention session	3	2	1	N

Evaluate progress along with the parent	3	2	1	N
Share information about the child's actions or developmental sequence or about behaviors related to the child's goals	3	2	1	N

Did the caregiver...	Almost Always	Some times	Never	No Opportunity
Choose or initiate activities for this session	3	2	1	N
Share relevant information with the provider	3	2	1	N
Expand on the child's actions with an additional response	3	2	1	N
Increase opportunities for the child to participate	3	2	1	N
Encourage the child by taking part in the session	3	2	1	N
Promote access to materials	3	2	1	N
Take an active role in session activities	3	2	1	N
Join the child in what he/she is doing	3	2	1	N
Remain at the child's eye level while interacting with the child, or in the child's visual range at other times	3	2	1	N
Provide verbal encouragement for the child	3	2	1	N
Show a warm and positive affect toward the child	3	2	1	N
Pay attention to the session activities	3	2	1	N

Validation and Social Validity Measures

In addition to the videotape data and its associated coding procedures, two additional measures were developed to gather evaluative feedback from experts and raters: (a) the *Content Validation Form*, completed only by the expert panel and (b) the *User Feedback Survey*, completed by both the expert panel and raters.

Expert Content Validation Form. The *Content Validation Form* was designed to gather quantitative data using an item-by-item ordinal scale and qualitative data in which experts responded to three supplemental questions (McCoach et al., 2013) (see Appendix B). The form consisted of two tables: provider items (behaviors) and caregiver items (behaviors) as written on the first *TIERS-R* draft. The form contained a 4-point scale in which experts were asked to rate each item's relevance/value and clarity: 1 (*not relevant, not clearly worded*), 2 (*somewhat*

relevant, somewhat clearly worded), 3 (*relevant, clearly worded*), 4 (*very relevant, very clearly worded*) (Beck & Gable, 2001). Experts also responded to supplemental questions regarding the layout of the *TIERS-R* and its content coverage (i.e., the extent to which the *TIERS-R* content covered adult behaviors that typically occur during triadic EI home visits).

User Feedback Survey. The *User Feedback Survey* was designed to gather social validity data using a 5-point, agree-disagree Likert scale. The form included statements intended to establish the *TIERS-R*'s feasibility, acceptability, appropriateness, and utility for capturing the dynamic nature of adult interactions. The survey's quantitative section is a comprehensive scale consisting of positive and negative statements. For positively worded Likert scale items, scaling was scored: (a) *strongly agree* = 5, (b) *agree* = 4, (c) *neither agree nor disagree* = 3, (d) *disagree* = 2, and (e) *strongly disagree* = 1. For negatively worded items, scores were reversed: *strongly agree* = 1, *agree* = 2, and so forth (McCoach et al., 2013). Scale items were proportionally distributed between positively and negatively worded statements covering the social validity of the *TIERS-R*. Additionally, experts and raters were asked to comment on the tool's design. Respondents were asked if they would use the tool during home visits as it is currently designed and were asked to offer suggestions to improve the overall design, if necessary (see Appendix C).

Embedded Practices and Intervention with Caregivers (EPIC) Measure

To assess communication and motor skills of the four children during the baseline phase (pre-intervention) and then again during the generalization phase (post-intervention), the EPIC project administered the Indicators for Infants and Toddlers-Early Communication Indicator (IGDI-ECI; Luze et al., 2001) and the IGDI-Early Movement Indicator (IGDI-EMI; Greenwood et al., 2002). Both measures have evidenced appropriate degrees of test-re-test and other approaches to reliability. Additionally, the tool's strong relationship to comparable measures

confirms its validity (Greenwood et al., 2002; Luze et al., 2001). IGDI pre-intervention results are displayed in Table 4.

Videotape Data Set

The EPIC project was a federally funded Goal 2 study that was based on a caregiver coaching framework in which providers systematically fostered caregiver capacity and competency so that caregivers could effectively support their child's learning and development within everyday activities and routines without provider involvement. Videos of providers, caregivers, and their children participating in the triadic intervention approach were recorded in Illinois and Florida over the course of three intervention development studies: (a) the TryOut study, (b) the Single Case Design (SCD) study, and (c) the Two-Group Comparison study. For the purpose of this study, previously collected data from the Illinois TryOut study were used for feasibility testing and rater training, and data from the Illinois SCD study were used for evaluating the *TIERS-R*. Videos used in this investigation reflected the entirety of each home visit. Videotape segments were included or excluded based on the following criteria:

INCLUSION CRITERIA: Home visit sessions/video segments were as follows: (a) the triad was visually and/or verbally present, (b) the triad was engaged in routines-based intervention and/or caregiver coaching, and (c) the intervention session took place in the family's authentic environment.

EXCLUSION CRITERIA: Home visit sessions/video segments in which one or more triad members were not present were excluded. Child-focused, provider-led EI sessions in which the provider: (a) worked directly with the child, (b) manufactured learning opportunities rather than capitalizing on naturally occurring activities/routines to embed instruction, or (c) brought outside materials to use during the session (Fleming et al., 2011; Salisbury & Cushing, 2013)

were excluded. Additionally, any videos in which more than just the immediate triad (i.e., provider-caregiver-child) was participating in the EI session were excluded to better capture reciprocal interactions between the provider and caregiver.

Procedures

An amendment to the previously approved IRB continuing review titled “*Embedded Practices and Intervention with Caregivers*” (EPIC) was submitted to and approved by the IRB. The purpose of this amendment was to add *TIERS-R* as a research measure and to seek approval to use *TIERS-R* to code videos using the extant EPIC data set for this dissertation study. In a manner similar to that described by McCoach and colleagues (2013), the *TIERS* was revised in four phases using a systematic process: (a) content and format revision, (b) expert validation, (c) feasibility testing and second revision of the *TIERS-R*, and (d) small-scale evaluation of the *TIERS-R*.

Phase 1: Content and Format Revision

In the first phase of the study, I revised the content and format of the original *TIERS*. The purpose of this phase was to refocus the *TIERS* from capturing linear adult interactions to capturing reciprocal adult behaviors. Item content was revised to reflect contemporary, evidence-informed practices (behaviors) that occur during coaching-based, triadic interventions. Adult behaviors were identified by examining the literature that describes key principles and practices associated with triadic interactions: capacity building, caregiver implemented intervention, and embedded instruction. Specifically, **provider behaviors** (n=14) were based on Woods, Snyder, and Salisbury’s SOOPR coaching practices (2018) and original *TIERS*’ items (Basu et al., 2010) that were affirmed in the current literature. **Caregiver behaviors** (n=13) were identified and operationally defined from the extant research on caregiver-implemented intervention (e.g., EMT

strategies (Roberts & Kaiser, 2012; Windsor et al., 2019)), naturalistic social-communication intervention strategies (Kashinath et al., 2006), and the original *TIERS*' items (Basu et al., 2010).

The *TIERS*' format and coding procedures were revised so that the measure could assess reciprocal adult behaviors as they occurred during triadic home visits. The original *TIERS* utilized a 3-point ordinal scale. The *TIERS-R* coders are instructed to record specific adult behaviors and times at which they occur allowing for the identification of the occurrence of reciprocal adult behaviors. Doing so afforded a preliminary, yet thicker description, of what occurs between adults during EI home visit sessions. See Appendix D for the original revision of the *TIERS*' items and format.

Phase 2: Expert Validation

During Phase 2, the 11 consented experts provided evaluative feedback regarding the content and format revisions made to the *TIERS* to determine whether the *TIERS-R* captures relevant, observable, and measurable adult behaviors as they occur during triadic intervention.

Expert Content Validation. The draft *TIERS-R* and a *Content Validation Form* was sent via email to each faculty/researcher and practitioner expert requesting feedback regarding the instrument's item relevancy and clarity and the layout of the proposed *TIERS-R* format. Experts rated the relevancy and clarity of each item on a four-point Likert scale. Relevancy scores were calculated for each item using the content validity index (I-CVI) to determine if items were pertinent to triadic home visit sessions (Beck & Gable, 2001; McCoach et al., 2013). Items that fell below 0.80 were reworded to better reflect what occurs during triadic home visits. Item clarity was calculated by taking the average of scores across experts. Items that scored a 1 or 2 were rewritten to improve clarity (McCoach et al., 2013). Experts' supplemental feedback guided the revision of each item that did not meet the relevancy or clarity criteria. Additionally,

experts were asked to answer questions regarding the *TIERS-R* format and content coverage. Specifically, experts were asked to comment on the design of the *TIERS-R* format and whether the tool's items were inclusive of adult behaviors that occur during triadic home visits. Expert feedback was used to guide the second revision draft of the *TIERS-R*. See Appendix E for the "semi-final" draft of the *TIERS-R*.

Phase 3: Feasibility Testing and Revision of TIERS-R Draft

The purpose of Phase 3 was to establish the feasibility and utility of *TIERS-R*. Following the expert validation process, the five practitioners who were members of the expert panel participated in a feasibility test of the *TIERS-R* (McCoach et al., 2013) to establish the tool's utility and appeal. Practitioners from the expert panel used the "semi-final" draft of the *TIERS-R* to rate adult interactions that occurred during EI home visits. Practitioners' *User Feedback Form* responses from the feasibility testing guided the final revisions of the *TIERS-R*.

Feasibility Testing. Using the *TIERS-R* and its administration manual, five consented practitioners coded two, 10-minute video segments of EI home visits using videotapes from EPIC's Tryout study. All of the TryOut study EI home visit videos from the EPIC data set were watched in their entirety and based on the inclusion and exclusion criteria (see Videotape data set section), the investigator selected one caregiving and one play routine each of which was close to 10 minutes in duration. No videos from the EPIC single case data set (used in the small-scale evaluation) were used. Differences between EPIC's TryOut study and single case study might have affected the manner in which videotaped data were coded, and therefore each data set was assigned to the feasibility testing and small-scale evaluation phases to ensure consistency. Prior to rating the two 10-minute segments, practitioners received a draft of the *TIERS-R*, the *TIERS-R* coding form, and the *TIERS-R* administration manual two weeks prior to participating in a one-

on-one Zoom session with the investigator. Each Zoom session included a review of the *TIERS-R* items and a review of the coding procedures as described in the administration manual in preparation for the feasibility test. Practitioners were encouraged to refer to the manual as they coded independently. One segment included a triad engaged in a play routine and in a caregiving routine. Once they completed coding, practitioners received a *User Feedback Survey* in which they provided feedback based on their experience using the *TIERS-R* materials to rate EI home visit videos. *User Feedback Survey* responses were scored and analyzed to make the final modifications to the *TIERS-R* before training raters to code videos of triadic home visits during the small-scale evaluation activity.

Revision of *TIERS-R* Draft. During Phase 3, responses from the practitioners' *User Feedback Surveys* were scored and analyzed and used to guide the final revision of the *TIERS-R*, its coding form, and the *TIERS-R* administration manual. The average of practitioners' scores for each statement was calculated and analyzed to better understand the tool's ability to capture the dynamic nature of provider-caregiver interactions as well as the clarity and utility of the *TIERS-R* components (i.e., legend, coding abbreviations, and coding table). Based on practitioner responses, final revisions to items were made and the tool's coding system was modified to address issues practitioners encountered while coding videotapes of home visits during the feasibility test. The administration manual was also modified to coincide with revised items as well as to improve the clarity of coding procedures. The final iteration of the *TIERS-R*, the administration manual, and its coding form can be found in Appendix F.

Following the revision of the *TIERS-R* draft, to ensure that revisions were appropriate, two experts were asked to review the original and revised items and definitions. Experts evaluated and scored the revised items and operationalized definitions to establish the clarity of

the revised items. Experts scored “yes” if the item and its definition were more clearly worded than the original and “no” if the item and/or definition remained unclear. There was also a section for comments to offer suggestions for improving clarity, if necessary.

Phase 4: Evaluation of TIERS-R

In Phase 4 a small-scale evaluation of the *TIERS-R* was conducted to: (a) investigate what specific provider behaviors are associated with caregiver use of development-promoting behaviors and (b) examine whether and/or how the adult behaviors defined in the *TIERS-R* change over time. Consented raters participated in a training of the *TIERS-R* and coded videotapes of triadic intervention home visits to evaluate the tool’s ability to assess adult behaviors as they occur during caregiving and play routines over the course of the intervention process.

Training of Raters. Two raters participated in a rigorous training process to learn how to code videotapes of triadic home visits using the *TIERS-R*, its coding form, and the administration manual. Both raters participated in a one-on-one Zoom training session in which they learned the purpose, uses, and procedures of the *TIERS-R*. Prior to the training session, raters received and were asked to review the final drafts of the *TIERS-R*, the *TIERS-R* coding form, and the *TIERS-R* administration manual. The training session consisted of a PowerPoint presentation, a Q&A period, and a quiz. The PowerPoint included: (a) the purpose and principles of the *TIERS-R*; (b) operationalized definitions of each behavior, their abbreviation codes, and video examples of each behavior; and (c) an in-depth description with examples of the *TIERS-R* coding procedures. Additionally, raters participated in a brief Q&A to address any follow-up questions regarding *TIERS-R* behaviors and/or coding procedures. To test rater proficiency, both independently coded five, one-minute video segments of triadic home visits. Video segments for

coding were selected from EPIC's TryOut study. Extracted and selected video segments met inclusion and exclusion criteria (see Videotape data set section). Interobserver agreement, with the investigator serving as the second coder, was established to determine raters' scores. Rater A's quiz scores ranged from 60%-75% ($M = 67.5$), and Rater B's quiz scores ranged from 33%-100% ($M = 66.5$). To improve proficiency, raters completed an additional three, one-minute segment quizzes: Rater A's new quiz scores ranged from 50%-100% ($M = 75\%$) and Rater B's new quiz scores ranged from 50%-88% ($M = 68.3$). To complete the training process and further develop proficiency, the investigator and raters reviewed the three, one-minute segments together to discuss any drifts in coding. Each adult behavior that occurred in the three video segments were discussed to establish agreement between the investigator and rater.

Continued training was required throughout the coding process to avoid drifts in coding. The investigator held bi-weekly booster sessions via Zoom with each rater to discuss coding decisions and procedures. Additionally, Zoom meetings were held before each rater began to code video segments of a new triad/family. During these meetings, the investigator and the rater would watch a video segment simultaneously, and the rater would code while the investigator observed. In the event the investigator identified an adult behavior the rater did not, or the rater selected a code that did not align with an identified adult behavior, the investigator would pause the video to discuss the coding discrepancy. Once the investigator and rater came to an agreement, the rater would continue to code the video segment. Meetings lasted one and a half to two hours each.

Evaluating the *TIERS-R*. During the final activity in Phase 4, two raters who participated in the training coded videotapes of triadic intervention sessions using the *TIERS-R*, the *TIERS-R* coding form, and the *TIERS-R* administration manual. Raters were instructed to

independently code randomly assigned 10-minute segments of caregiving and play routines using the *TIERS-R* coding form selected and extracted from EPIC's SCD study.

The number of intervention sessions from EPIC's SCD study ranged from seven to 14 across the four triads for a total of 39 intervention sessions. The first intervention session for each triad was excluded as EPIC's first overview of the intervention session did not meet the criteria for this study. Additionally, three intervention sessions in their entirety and eight play or caregiving routines were excluded because they did not meet the inclusion criteria. A total of 63, 10-minute segments, 35 play routines (n=55.6%) and 28 caregiving routines (n=44.4%), were selected for coding using the *TIERS-R*. Ten-minute segments of one caregiving routine and one play routine were selected and extracted from most EPIC intervention sessions across each triad. The length of segments was long enough to capture triadic transactional interactions as they occurred across different routines but brief enough to efficiently measure adult interactive behaviors. These video segments were distributed equally between the two raters.

To evaluate the *TIERS-R*, raters were instructed to record the occurrence of adult behaviors defined in the *TIERS-R* using the developed coding form (see Table 6 for definitions of behaviors coded). The *TIERS-R* coding form was designed to capture adult transactional interactions by coding adult reciprocal behaviors that occur within a 10-second time window. The selected time window derives from Brown and Woods (2016) expressed concerns that their 5-second time window criterion potentially excluded relevant contingent behaviors resulting in study limitations. Extending the time window provided more opportunities to capture adult reciprocal behaviors that occurred during provider-caregiver interactions. The coding form included a legend of adult behaviors and their assigned abbreviations, a table for coding

observed adult behaviors, and the time stamps to mark the time in the video segment at which each behavior occurred.

TIERS-R Coding Procedures. The interval begins once a specific provider or caregiver behavior (*TIERS-R* item) is observed in the video segment and ends when neither adult responds within the designated 10-second time window. Using the provided coding abbreviations assigned to each item, raters coded the initiating behavior, or the first observed behavior, in the row labeled “BI” and the column labeled “C-1.” The first responsive behavior, or the subsequent behavior observed that occurred within the 10-seconds of the initiating behavior, was coded with the appropriate coding abbreviation in the row below labeled “BR.” All sequential responsive behaviors that occurred within the allotted time window were coded in the subsequent BR cells in the same column until there was a timing violation, or no reciprocal behaviors occurred within 10 seconds. Additionally, time stamps were recorded for each coded behavior. In the event no behaviors took place within 10 seconds or a distraction occurred (e.g., phone rings, sibling needs assistance, etc.) raters coded an “X,” moved to the column to the right (C-2, C-3, C-4, etc.), and repeated the steps. This process continued until the end of the 10-minute segment. A sample coding sheet is included in Appendix G.

Table 6*Definitions of Behaviors Coded*

Provider Code ¹	Definitions
1. Observes caregiver-child interactions	Provider visually orients and watches the caregiver-child interaction in activity/routine without commenting.
2. Explains embedded intervention	Provider describes what, when, where, why, and/or how to embed a specific teaching strategy (i.e., a strategy designed to build and support child development) into an authentic daily activity/routine.
3. Prompts participation	Provider verbally cues caregiver and/or child to interact with one another or materials during an activity/routine.
4a. Provides caregiver explicit feedback	Provider offers constructive comments or suggestions to improve the caregiver's ability to implement a strategy.
4b. Provides caregiver general feedback	Provider offers encouragement to the caregiver and/or child (e.g., "Yay! You signed more!") immediately following caregiver's and/or child's actions or behaviors.
5. Demonstrates strategy	Provider models a target strategy simultaneously narrating what he/she is doing while the caregiver observes.
6. Uses expansion with child	Provider scaffolds or builds upon child utterances or behaviors to enhance or increase learning opportunities.
7. Arranges environment for caregiver and child	Provider intentionally organizes the space or situation to increase child learning opportunities (e.g., situates him/herself or objects out of reach).
8. Responds contingently to child	Provider acknowledges (i.e., physically responds to child's communication efforts) or comments (i.e., verbally responds to child's communication efforts) on child's attempt or execution of target behaviors OR imitates child's utterances or actions immediately following the child's behavior.
9. Uses wait time with child	Provider presents the child with a desirable object and provides a fixed amount of time for the child to respond verbally or physically. OR the provider waits for the child to respond to or initiate communication during an interaction.
10. Initiates discussion	Provider comments or asks a question to begin a turn-taking interaction with the caregiver.

11. Asks caregiver self-evaluative questions	Provider asks the caregiver questions that support the caregiver to assess his/her capacity to implement newly learned strategies or to embed intervention into his/her daily activities/routines.
12. Asks caregiver reflective questions	Provider asks the caregiver WHY a strategy or activity/routine did or did not go well/work.
13. Asks caregiver interpretive questions	Provider asks caregiver HOW/IN WHAT WAYS strategies might be implemented or incorporated in family activities/routines.
14. Responds to caregiver questions	Provider directly responds to the caregiver's questions OR initiated discussion.

Caregiver Code	Definitions
1. Observes provider	Caregiver visually orients and watches the provider in a routine, activity, or interaction with the child.
2. Explains embedded intervention	Caregiver describes what, when, where, why, and/or how to embed a specific teaching strategy into an authentic daily activity/routine.
3. Prompts child participation	Caregiver verbally cues child to interact with caregiver or materials in a meaningful and functional activity/routine.
4a. Provides child explicit feedback	Caregiver offers child supportive or constructive comments or suggestions immediately following the child's actions or behaviors in an activity/routine.
4b. Provides child general feedback	Caregiver offers encouragement to the child (e.g., "Yay, you did it! You walked two steps!") immediately following child's actions or behaviors.
5. Demonstrates strategy	Caregiver models a target strategy when interacting with the child while the provider observes.
6. Uses expansion with child	Caregiver scaffolds or builds upon child utterances or behaviors to enhance or increase learning opportunities.
7. Arranges environment for child	Caregiver intentionally organizes the space or situation to increase child learning opportunities (e.g., situates him/herself or objects out of reach).

8. Responds contingently to child	Caregiver acknowledges, comments, or imitates child's utterances or actions immediately following the child's behavior.
9. Uses wait time with child	Caregiver presents the child with a desirable object and provides a fixed amount of time for the child to respond verbally or physically. OR the caregiver waits for the child to respond to or initiate communication during an interaction.
10. Initiates discussion	Caregiver comments or asks a question to begin a turn-taking interaction with the provider.
11. Asks provider reflective questions	Caregiver asks the provider WHY a strategy or routine did or did not go well/work.
12. Asks provider interpretive questions	Caregiver asks provider HOW/IN WHAT WAYS strategies might be implemented or incorporated in family activities/routines.
13. Responds to provider questions	Caregiver directly responds to provider self-evaluative, reflective, or interpretive questions OR initiated discussion.

¹ Wording of some items was drawn from "Caregiver coaching strategies for early intervention providers moving toward operational definitions," by M. Friedman, J. Woods, & C. Salisbury, 2012, *Infants & Young Children*, 25, 62–82. Wording of some items was drawn from "Embedded practices and intervention with caregivers (EPIC) linking instruction and family capacity-building recommended practices," by J. J. Woods, P. Snyder, & C. Salisbury, 2018, *DEC recommended practices monograph series no. 4 instruction: Effective strategies to support, engagement, learning, and outcomes* (pp. 145-158).

Inter-Rater Agreement

For the *TIERS-R* coding system, 25% of the videotaped segments for both raters were independently coded by the primary investigator (reference rater) to ensure ongoing reliability. Each video was divided into three segments of equal time. The percent agreement between the rater and the reference rater was calculated for each time segment. For each *TIERS-R* item 1) if the rater observed the behavior more frequently than the reference rater, the percentage agreement was calculated as the number of times the reference rater saw the behavior divided by the number of times the rater saw the behavior, and 2) if the reference rater saw the behavior more times than the rater, the percentage agreement was calculated as the number of times the rater saw the behavior divided by the number of times the reference rater observed the behavior. If the rater and reference rater observed the behavior the same number of times or both raters agreed that the behavior did not occur during the time segment, the percentage agreement was deemed to be 100%.

Two averages were calculated for each *TIERS-R* items: 1) a simple average of the percentages described above and 2) a weighted average, with the weighting based on the numbers of times the rater observed a particular behavior divided by the total number of behaviors observed by the rater. Each of these two averages was then averaged across all three time segments for each video, with weighting based on how many total behaviors the rater saw in each time segment. See appendix H for an example of the calculations for a single video. These averages were then averaged across all 16 videos coded by the rater and the reference rater. The simple average for all 16 videos was 87%. The weighted average was 80%.

Data Analysis

For the purpose of this study, observational data from videotapes of triadic EI home visits were aggregated to evaluate the *TIERS-R*. Associations between provider and caregiver behaviors

and how adult behaviors and reciprocity changed over time were calculated and analyzed. Four types of analyses were used: (a) sequential analysis, (b) transitional probabilities, (c) descriptive analysis, and (d) social validity.

Sequential Analysis

Using Yule's Q sequential analysis, the association between provider and caregiver behaviors was analyzed (Lloyd et al., 2013; Yule & Kendall, 1957). Coding abbreviations listed on the *TIERS-R* coding forms were converted to numbers in Excel. Data were calculated using the Yule's Q formula $(AD-BC/AD+BC)$ in SAS to determine positive associations between adult behaviors during interactions (Bakeman & Quera, 2011; Lloyd, et al., 2013). The strength and sequential associations between adult behaviors were calculated to identify positive and negative relationships. Yule's Q ranges from + 1, signifying a perfect positive relationship to - 1, signifying a perfect negative relationship (Lloyd et al., 2013; Yoder & Symons, 2010). Observed sequential frequencies that fall within the positive range of Yule's Q suggest a relationship between behaviors beyond chance alone. The larger the number, the stronger the association between behaviors. Yule's Q values of sequential association were analyzed to determine the direction and valence of relationships between adult behaviors and to establish if *TIERS-R* revealed any potential interactional patterns.

Transitional Probabilities

To improve the descriptive value of observed associated behaviors that occurred during adult interactions, *transitional probabilities* were computed. The purpose of computing transitional probabilities is to determine the likelihood of a specific adult behavior occurring in response to another specific behavior (i.e., "the proportion of instances of one event that are followed by another event in a sequence" (Yoder & Symons, 2010, as cited in Lloyd et al., 2013)). In a

transitional probability, the subsequent, or target behavior *could* occur after a variety of antecedent behaviors regardless of whether it occurred during the video segment (Yoder & Symons, 2010).

Transitional probabilities were calculated in SAS. Additionally, to ensure all potential associations between adult behaviors were identified, column codes were exhaustive.

Descriptive Analysis

To identify if and how adult behaviors changed over time during triadic intervention (i.e., providers relinquish control or caregivers become more assertive) descriptive analysis was used. Triadic home visit sessions for each dyad were categorized into three groups: beginning, middle, and end. If the number of sessions was divisible by three, the investigator divided the number of session by three and assigned an equal number of session to beginning, middle, and end. If the number of sessions was not divisible by three, the appropriate adjustments were made to come as close as possible to an equal number of sessions in each group. The number of intervention sessions and inclusion/exclusion criteria resulted in varying durations for each of the three groups ranging from 00:39:55 to 00:80:44. Each group duration was converted from time to decimal in order to calculate the rate of each behavior across each group and dyad. The rate of behaviors for both providers and caregivers was calculated and graphed. Changes (i.e., increase or decrease) in the occurrence of reciprocal and dynamic adult interactions were assessed by calculating the frequency with which turn-taking and sequential interactions were observed during data collection. Resulting data were organized so that trends visually represented patterns of reciprocal interactions across aggregated EI sessions for each family.

Social Validity

Social validity of the *TIERS-R* was evaluated at three time points: (a) during the content validation of the *TIERS-R* (first draft), (b) after the feasibility test, and (c) following the *TIERS-R*

evaluation phase. Social validity data were collected using *Content Validation Form* and the 12-item *User Feedback Survey* to evaluate whether the *TIERS-R* captures relevant, observable, and measurable adult behaviors as they occur during triadic intervention. Expert panel members rated the relevance and clarity of each *TIERS-R* item on a scale of 1 to 4 (*not relevant to early intervention home visits, not clearly worded*) to (*very relevant to early intervention home visits, very clearly worded*). Practitioners and raters provided feedback on the *TIERS-R* utility, acceptability, and feasibility by completing a 5-point Likert scale with a fill-in-the-blank supplemental question requesting suggestions and recommendations for improving the tool's overall feasibility. Their feedback was used to evaluate whether the *TIERS-R* captures relevant, observable, and measurable behaviors.

IV. RESULTS

The purpose of the four-phase *TIERS-R* development process was to revise the original *TIERS* to examine: (a) whether *TIERS-R* captured relevant, observable, and measurable adult behaviors; (b) what provider behaviors were associated with caregiver behaviors, if any; and (c) how adult behaviors changed over time during triadic intervention. Key results are presented below in relation to the research questions posed for this investigation.

Research Question 1: *TIERS-R* Relevant, Observable, and Measurable Behaviors

To determine if *TIERS-R* provider and caregiver items (behaviors) were relevant, observable, and measurable, responses from the *Content Validation Form (CVF)* and the *User Feedback Survey (UFS)* were scored and analyzed. A total of 11 experts (six researchers and five practitioners) completed the *CVF* during Phase 2, the five practitioners completed the *UFS* during Phase 3, and two raters completed the *UFS* during Phase 4. Key results are reported below.

Item relevance for the initial *TIERS-R* was determined by computing the content validity index (I-CVI) of the Likert-scale ratings of the 11 experts. An I-CVI of .78 was established as the threshold for content relevance (McCoach et al., 2013). All provider items (n=14) scored an average I-CVI of .78 or above for item relevance with the exception of item 10 (i.e., “leads discussion”) which averaged a I-CVI score of .72. Eleven of the 13 caregiver items resulted in an average I-CVI of .78 or above for relevance. Item 12 (i.e., “asks interpretive questions”) averaged a I-CVI of .72, and item 13 (i.e., “responds to questions”) averaged a I-CVI of .54. Based on *CVF* responses, a second iteration of the *TIERS-R* was developed. A comprehensive table of the experts’ content validity results for the initial *TIERS-R* can be found in Table 10.

Item clarity was calculated by taking the average of experts’ scores, 1 through 4. All provider items except for one received an average score of 3.0 or above (*clearly worded* – *very*

clearly worded) for item clarity. The remaining item (i.e., “responds contingently to child”) averaged a score of 2.63. Ten of the 13 caregiver items averaged a score of 3.0 or above. The remaining three items, “provides feedback,” “demonstrates strategy,” and “responds contingently to child,” received average scores of 2.45, 2.81, and 2.55, respectively.

To confirm the relevance, observability, and measurability of the revisions to the *TIERS-R*, the *UFS* data (5-point scale) were analyzed. All five practitioners either *agreed* or *strongly agreed* that they could identify a series of adult interactions using the *TIERS-R* ($M = 4.4$). Practitioners reported that the *TIERS-R* captures a detailed description of adult interactions as they occur during EI home visits ($M = 4.2$). Practitioners also agreed that they were able to identify specific coaching strategies that impact caregiver teaching and learning using the *TIERS-R* ($M = 4.4$). Practitioners varied as to whether they would use the *TIERS-R* during EI home visits to assess the quality of their coaching practices and whether they found the *TIERS-R* valuable for evaluating their own practices ($M = 3.2$) and ($M = 3.8$), respectively. However, practitioners agreed that the *TIERS-R* is likely to improve their understanding of adult interactions during EI home visits ($M = 4.0$). Two of the five practitioners reported observing coaching behaviors that were not listed on the *TIERS-R* ($M = 3.0$). Only two practitioners reported that coding abbreviations made the coding process simpler ($M = 3.0$), and practitioners’ reports about needing more space to record coding abbreviations on the data sheet varied ($M = 3.8$). All five practitioners reported the *TIERS-R* items to be measurable and observable ($M = 4.2$). Finally, practitioner participants largely agreed that the *TIERS-R* administration manual clearly describes procedures to code videos using the *TIERS-R* ($M = 4.2$).

After revisions were made to the *TIERS-R* based on the feedback from the five practitioners, two of the practitioners reviewed and scored the third iteration of *TIERS-R*. One practitioner expert agreed that all items and definitions were clearer than the initial *TIERS-R* draft, and the second

practitioner expert suggested including examples for “prompts participation” and “uses expansion” to improve overall clarity.

Two raters responded to the *UFS* after each coded approximately 315 minutes of video using the *TIERS-R* during the small-scale evaluation of the tool. Both raters *strongly agreed* that: (a) a series of adult interactions were identifiable using the *TIERS-R*; (b) practitioners may find the tool valuable for assessing their own practices; (c) the coding abbreviations made the coding process easier; and (d) specific coaching practices that impacted caregiver teaching and learning were identifiable using the *TIERS-R*. Both raters either *agreed* or *strongly agreed* that: (a) the *TIERS-R* captures a detailed description of adult interactions as they occur during home visits; (b) the *TIERS-R* is likely to enhance practitioner understanding of adult interactions during home visits; (c) they would use the *TIERS-R* to assess the quality of their own coaching practices; (d) the *TIERS-R* items were observable and measurable when watching video home EI home visits; and (e) additional space was not needed for recording the *TIERS-R* abbreviations in the coding form. Both raters reported that the administration manual clearly described the *TIERS-R* coding procedures. However, both *agreed* that they observed coaching behaviors that were not listed on the *TIERS-R*. Supplemental feedback suggested that the “provider- caregiver initiating discussion” (i.e., PID and CID) items were too general and should be narrowed down into more specific behaviors that would improve the field’s understanding of what occurs during adult interactions.

Research Question 2: Sequential Associations Between Provider and Caregiver Behaviors

To investigate the associations between adult behaviors as they occurred during triadic home visits using the *TIERS-R*, sequential analyses were used. Yule’s Q and transitional probabilities were calculated for 10-minute segments drawn from 36 home visit sessions that occurred over a 5-month period. A total of 630 minutes of videotape was coded. To ensure sufficient quantity of data

for analysis, data collected from play and caregiving routines were aggregated and analyzed collectively.

Frequency and Proportion of Provider and Caregiver Behaviors

All provider behaviors were observed at least once across the 63, 10-minute video segments. Two caregiver behaviors, “asks provider reflective questions” and “asks provider interpretive questions,” were never observed, and therefore were removed from the analysis. Frequency of adult behaviors are displayed in Table 7. Behavior frequencies are recorded in the order listed in the *TIERS-R*. The proportion of observed frequencies relative to the total number of coded behaviors is also reflected in Table 7.

Table 7

Frequency of Provider and Caregiver Behaviors

Provider Behavior	Frequency (f)	Proportion of All Codes
Observes caregiver-child interactions	432	12.4%
Explains embedded intervention	7	0.2%
Prompts participation	138	3.4%
Provides caregiver explicit feedback	111	3.2%
Provider caregiver general feedback	181	5.2%
Demonstrates strategy	23	0.7%
Uses expansion with child	6	0.2%
Arranges environment for caregiver and child	43	1.2%
Responds contingently to child	185	5.3%
Uses wait time with child	24	0.7%
Initiates discussion	428	12.3%
Asks caregiver self-evaluative questions	2	0.1%

Asks caregiver reflective questions	9	0.3%
Asks caregiver interpretive questions	10	0.3%
Responds to caregiver questions	123	3.5%
Caregiver Behaviors	Frequency (f)	Proportion of All Codes
Observes provider	39	1.1%
Explains embedded intervention	4	0.1%
Prompts child participation	545	15.7%
Provides child explicit feedback	21	0.6%
Provides child general feedback	178	5.1%
Demonstrates strategy	415	11.9%
Uses expansion with child	6	0.2%
Arranges environment for child	86	2.5%
Responds contingently to child	587	16.9%
Uses wait time with child	71	2.0%
Initiates discussion	187	5.4%
Asks provider reflective questions	0	0.0%
Asks provider interpretive questions	0	0.0%
Responds to provider questions	242	7.0%

Associated Adult Behaviors

Yule's Q statistics were used to determine whether the occurrence of one adult behavior was associated with a subsequent behavior by the other adult beyond chance within a 10-second time window (Yoder & Symons, 2010; as cited in Lloyd et al., 2013). Only sequences that had an expected frequency of greater than 5 are included in the Tables in order to avoid sparse table issues

(Yoder & Symons, 2010). Transitional probabilities (p_{ij}) were also calculated and are included in both Tables. Large, moderate, and small Yule's Q values are 0.6, 0.43, and 0.2, respectively (Yoder & Symons, 2010). Large positive and negative associations between provider antecedent and caregiver response behaviors with a Yule's Q large effect size of |0.6|(rounded) are displayed in Table 8. Large positive and negative associations between caregiver antecedent behaviors and provider response behaviors with a Yule's Q effect size of |0.6| (rounded) are displayed in Table 9.

Table 8*Yule's Q Values and Transitional Probabilities for Provider to Caregiver Sequences*

Provider behaviors	Caregiver behaviors	Effect size	p_{ij} (%)
Provides general feedback (PGFB)	Provides child general feedback (CGFB)	.747	22.84
Provides caregiver explicit feedback (PEFB)	Demonstrates strategy (CDEM)	.569	31.31
Initiates discussion (PID)	Responds to provider comments or questions (CRTQ)	.982	55.50
Observes caregiver-child interactions (PO)	Arranges environment for child (CEA)	.691	8.20
	Initiates discussion (CID)	-.652	0.94
	Responds to provider comments or questions (CRTQ)	-.947	0.23
Provider prompts (PPCG)	Responds to provider comments or questions (CRTQ)	-1.00	0.00
Provides explicit feedback (PEFB)	Responds to provider comments or questions (CRTQ)	-.766	1.01
Provides general feedback (PGFB)	Responds to provider comments or questions (CRTQ)	-.724	1.23
Responds contingently (PRC)	Respond to provider comments or questions (CRTQ)	-1.00	0.00

Initiates discussion (PID)	Demonstrates strategy (CDEM)	-.656	2.95
Responds to caregiver comments or questions (PRTQ)	Responds to provider comments or questions (CRTQ)	-1.00	0.00
Initiates discussion (PID)	Uses wait time (CWT)	-1.00	0.00

Table 9*Yule's Q Values and Transitional Probabilities for Caregiver to Provider Sequences*

Caregiver behaviors	Provider behaviors	Effect size	p_{ij} (%)
Responds to provider comments or questions (CRTQ)	Observes caregiver-child interaction (PO)	.680	16.36
Provides child general feedback (CGFB)	Provides general feedback (PGFB)	.765	24.03
Demonstrates strategy (CDEM)	Provides caregiver explicit feedback (PEFB)	.654	9.63
Initiates discussion (CID)	Responds to caregiver questions (PRTQ)	.996	64.53
Provides general feedback (CGFB)	Prompts participation (PPCG)	-.694	0.65
Responds contingently (CRC)	Observes caregiver-child interaction (PO)	-.695	0.88
Responds contingently (CRC)	Responds to caregiver comments or questions (PRTQ)	-1.00	0.00
Initiates discussion (CID)	Provides general feedback (PGFB)	-.805	0.58

Table 10*Content Validation Form Results*

Item (Provider)	Item definition	Clarity	Relevance (I-CVI)
Observes another/others	Provider visually orients and watches the caregiver in a routine, activity, or interaction with the child without verbally or physically interrupting.	3.18	1.00
Explains embedded instruction	Provider describes when, where, and/or how to embed a specific teaching strategy into an authentic daily routine.	3.36	.91
Prompts participation	Provider intentionally cues caregiver or child to actively engage in a meaningful and functional activity.	3.36	.82
Provides feedback	Provider offers caregiver constructive comments or suggestions to improve the activity outcome and/or child development.	3.18	.91
Demonstrates strategy	Provider models a target strategy simultaneously narrative what he/she is doing while the caregiver watches.	3.54	1.00
Expands ideas/actions	Provider scaffolds or builds upon caregiver ideas or actions to enhance or increase learning opportunities.	3.73	1.00
Arranges environment	Provider intentionally organizes the space or situation to promote skills development.	3.27	.91
Responds contingently to child	Providers repeats/replicates the child's utterance or movement without remarking of clarifying.	2.63	1.00
Uses wait time with child	Providers presents the child with a desirable object and provides a fixed amount of time for the child Ann verbally or physically respond. OR the provider waits for the child to initiate communication during and interaction.	3.00	1.00
Leads discussion	Provider verbally initiates an interaction with the caregiver.	3.18	.72

Asks self-evaluative questions	The provider asks the caregiver questions that require the caregiver to assess his/her ability to implement newly learning strategies or embed instruction in to his/her authentic daily routines.	3.27	.91
Asks reflective questions	Provider asks the caregiver WHY a strategy or routine did or did not go well.	3.63	1.00
Asks interpretive questions	Provider asks caregiver HOW/IN WHAT WAYS strategies might be incorporated in family's routines/activities.	3.72	1.00
Responds to questions	Provider directly and relevantly responds to the caregiver's questions.	3.81	.91
Item (Caregiver)	Item definition	Clarity	Relevance (I-CVI)
Observes another/others	Caregiver visually orients and watches the provider in a routine, activity, or interaction with the child without verbally or physically interrupting.	3.45	.80
Explains embedded intervention	Caregiver describes when, where, and/or how to embed a specific teaching strategy into an authentic daily routine.	3.27	1.00
Prompts participation	Caregiver intentionally cues child to actively engage in a meaningful and functional activity.	3.72	.91
Provides feedback	Caregiver offers child constructive comments or suggestions to improve the activity outcome and/or child development.	2.45	.82
Demonstrates strategy	Caregiver models a target strategy for child simultaneously narrating what he/she is doing while the provider watches.	2.81	.91
Uses expansion	Caregiver scaffolds or builds upon child behaviors or enhance or increase learning opportunities.	3.91	1.00
Arranges environment	Caregiver intentionally organizes the space or situation to promote skill development.	3.64	1.00

Responds contingently to child	Caregiver repeats/replicates the child's utterance or movement without remarking or clarifying.	2.55	1.00
Uses wait time with child	Caregiver presents the child with a desirable object and provides a fixed amount of time for the child to verbally or physically respond. OR the caregiver waits for the child to initiate communication during an interaction.	3.27	1.00
Leads discussion	Caregiver verbally initiates an interaction with the provider.	3.27	.82
Asks reflective questions	Caregiver asks the provider WHY a strategy did or did not go well.	3.64	.80
Asks interpretive questions	Caregiver asks provider HOW/IN WHAT WAYS strategies might be incorporated in family routines/activities.	3.64	.72
Responds to questions	Caregiver directly and relevantly responds to the provider's questions.	3.55	.54

Note. Clarity scores represent the mean of expert panel responses based on a scale of 1 to 4 (low to high). Relevance scores represent the I-CVI of expert panel responses based on a scale of 1 to 4 (low to high).

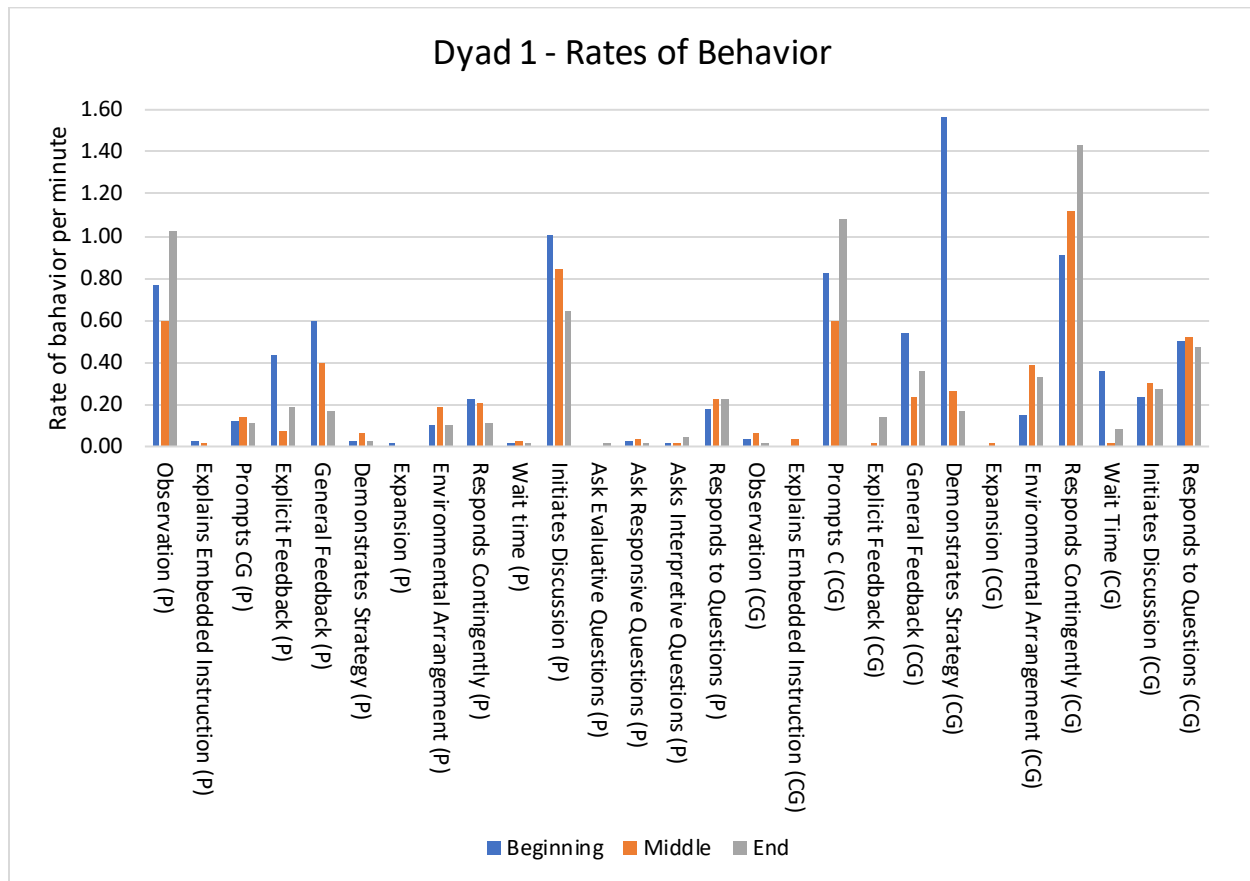
Research Question 3: Changes in Adult Behaviors Over Time

Changes in adult behaviors over time were analyzed for each of the four dyads by categorizing sessions as occurring at beginning, middle, and end of the total intervention sessions as described in Chapter 3. The frequency of coded adult behaviors was converted to rates of occurrence per minute to account for varying durations of the grouped sessions. The rates across the four dyads for provider and caregiver behaviors for beginning, middle, and end sessions are depicted in the graphs below. It might be expected that as caregivers adopted and implemented learned behaviors (e.g., “prompts child participation,” “arranges environment,” and “uses expansion”), providers would use less directive behaviors such as “explains embedded

intervention,” “demonstrates strategy,” and “provides caregiver explicit feedback.” This was not always the case across all four dyads.

Dyad 1: The child in this dyad was a 12-month-old boy with Down syndrome who had low muscle tone and displayed significant delays in the motor and expressive communication domains. The mother consistently interacted verbally and physically with the child and often held him during play. She was very responsive to and affectionate with her child. The focus of the intervention sessions was to improve the child’s communication, mobility, and self-feeding.

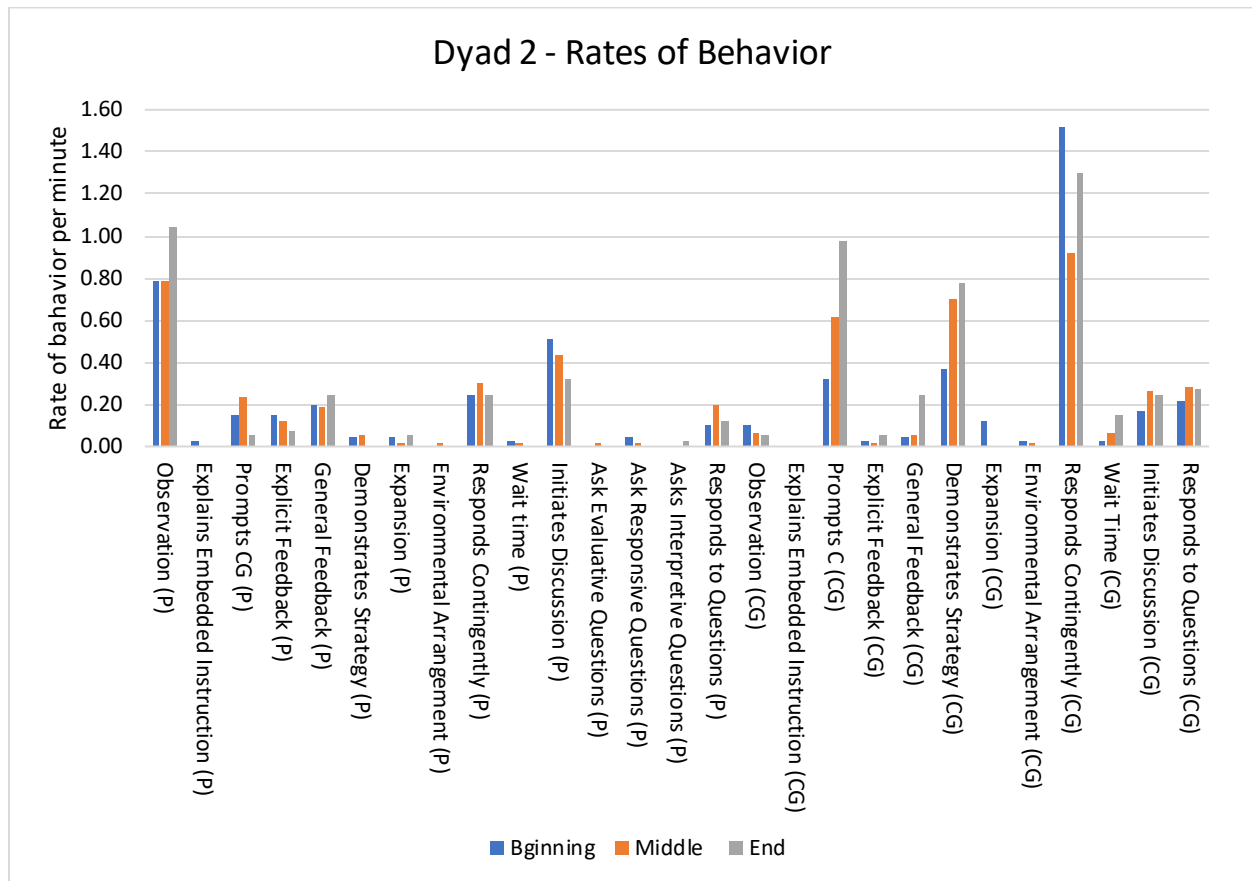
The provider rates of behavior that increased from the beginning sessions to the end sessions were: (a) “observes caregiver-child interactions,” (b) “demonstrates strategy”, (c) “asks caregiver self-evaluative questions,” (d) “asks caregiver interpretive questions,” and (e) “responds to caregiver questions.” The provider rates of behavior that decreased included: (a) “explains embedded intervention,” (b) “prompts participation,” (c) “provides caregiver explicit feedback,” (d) “provides caregiver general feedback,” (e) “uses expansion with child,” (f) “responds contingently to child,” (g) “initiates discussion,” and (h) “asks caregiver reflective questions.” Two provider behaviors were unchanged: (a) “arranges environment for child” and (b) “uses wait time with child.” The caregiver rates of behavior that increased from the beginning sessions to the end sessions were: (a) “prompts child participation,” (b) “provides child explicit feedback,” (c) “arranges environment for child,” (d) “responds contingently to child,” and (e) “initiates discussion.” Caregiver rates of behavior that decreased were: (a) “observes provider” (b) “provides child general feedback,” (c) “demonstrates strategy,” (d) “uses wait time with child,” and (e) “responds to provider questions.” Two rates of behavior were unchanged: (a) “explains embedded intervention and (b) “uses expansion with child.” The graph below depicts rates of behavior for the beginning, middle, and end intervention sessions for this adult Dyad.

Figure 1*Changes in Rates of Behavior: Dyad 1*

Dyad 2: The child in this dyad was a two-and-a-half-year-old boy who was diagnosed with autism spectrum disorder (ASD). He was echolalic, evidenced emotional dysregulation, and preferred independent play. The mother showed limited interaction with her child unless prompted and expressed that she was experiencing symptoms of post-partum depression. The focus of the intervention was to improve the child's communication (appropriate and spontaneous language) and fine motor skills.

The provider rates of behavior that increased from the beginning sessions to the end sessions were: (a) "observes caregiver-child interactions," (b) "provides caregiver general feedback," (c) "asks caregiver interpretive questions," and (d) "responds to caregiver questions." The provider rates of behavior that decreased from the beginning sessions to the end sessions were: (a) "explains

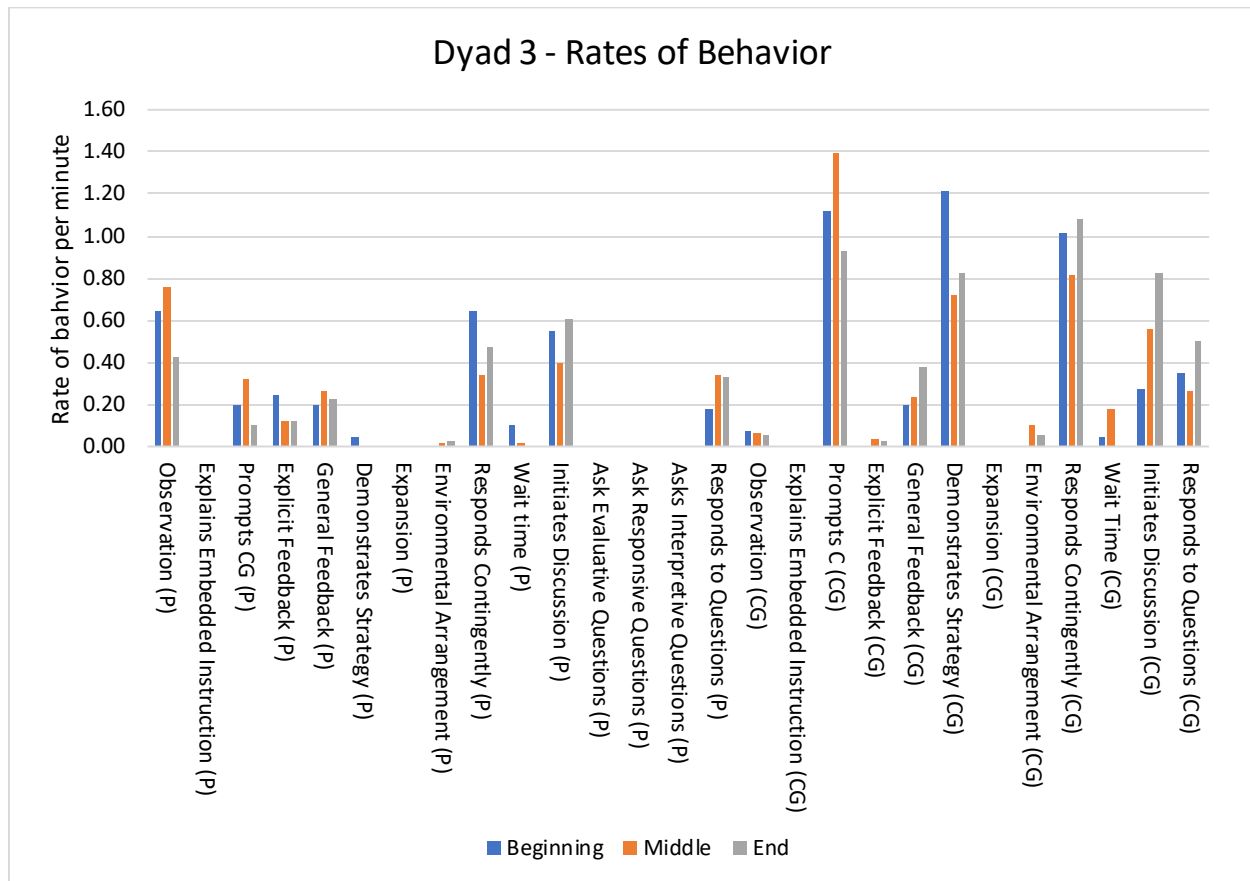
embedded intervention,” (b) “prompts participation,” (c) “provides caregiver explicit feedback,” (d) “demonstrates strategy,” (e) “uses wait time with child,” (f) “initiates discussion,” and (g) “asks caregiver reflective questions.” Provider rates of behavior that were unchanged were: (a) “uses expansion with child,” (b) “arranges environment for caregiver and child,” (c) “responds contingently to child,” and (d) “asks caregiver self-evaluative questions.” The caregiver rates of behavior that increased from the beginning sessions to the end sessions were: (a) “prompts child participation,” (b) “provides child explicit feedback,” (c) “provides child general feedback,” (d) “demonstrates strategy,” (e) “uses wait time with child,” (f) “initiates discussion,” and (g) “responds to provider questions.” Caregiver rates of behavior that decreased were: (a) “observes provider,” (b) “uses expansion with child,” (c) “arranges environment for child,” and (d) “responds contingently to child.” One caregiver rate of behavior remained unchanged: (a) “explains embedded intervention.” The graph below depicts rates of behavior for the beginning, middle, and end intervention sessions for Dyad 2.

Figure 2*Changes in Rates of Behavior: Dyad 2*

Dyad 3: The child in this dyad was a two-year-old boy with developmental delays in the communication and motor domains. The child was not able to walk independently but could walk with assistance (e.g., a walker, leg braces). He evidenced receptive communication skills but did not regularly vocalize his wants or needs. The mother was a responsive and affectionate caretaker who participated in his play and caregiving routines, but she did not focus on encouraging him to vocalize/express himself. The focus of the intervention sessions was to have the child stand unsupported and imitate one-word utterances.

The provider rates of behavior that increased from the beginning sessions to the end sessions were: (a) “provides caregiver general feedback,” (b) “arranges environment for caregiver and child,” (c) “initiates discussion,” and (d) “responds to caregiver questions.” The provider rates of

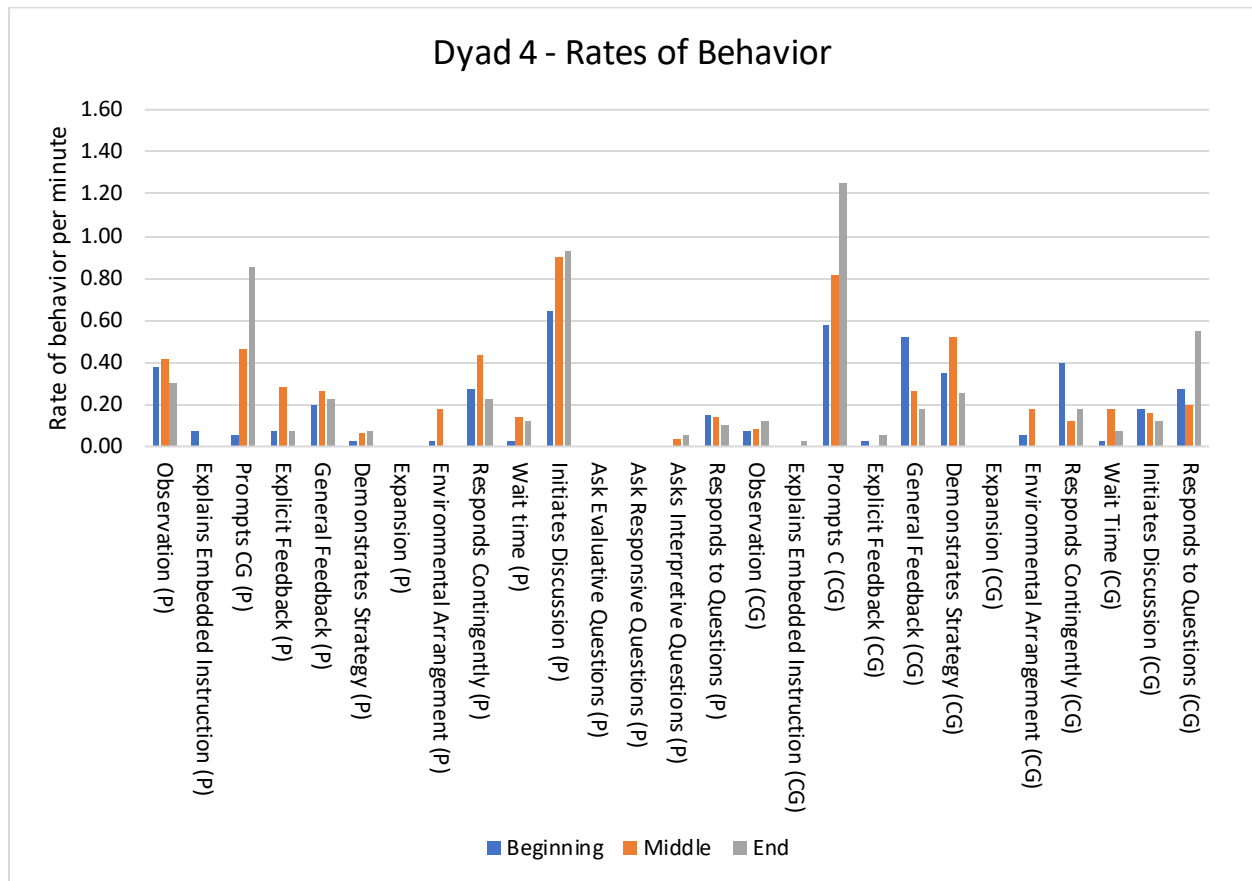
behavior that decreased from the beginning sessions to the end sessions were: (a) “observes caregiver-child interactions,” (b) “prompts participation,” (c) “provides caregiver explicit feedback,” (d) “demonstrates strategy,” (e) “responds contingently to child,” and (f) “uses wait time with child.” Provider rates of behavior that remained unchanged were: (a) “explains embedded intervention,” (b) “uses expansion with child,” (c) “asks caregiver self-evaluative questions,” (d) “asks caregiver reflective questions,” and (e) “asks caregiver interpretive questions.” The caregiver rates of behavior that increased from the beginning sessions to the end sessions were: (a) “provider child explicit feedback,” (b) “provides child general feedback,” (c) “arranges environment for child,” (d) “responds contingently to child,” (e) “initiates discussion,” and (f) “responds to provider questions.” Caregiver rates of behaviors that decreased were: (a) “observes provider,” (b) “prompts child participation,” (c) “demonstrates strategy,” and (d) “uses wait time with child.” Two caregiver rates of behavior remained unchanged: (a) “explains embedded intervention” and (b) “uses expansion with child.” The graph below depicts rates of behavior for the beginning, middle, and end intervention sessions for Dyad 3.

Figure 3*Changes in Rates of Behavior: Dyad 3*

Dyad 4: The child in this dyad was a 22-month-old boy with Down syndrome. He had significant communication and fine motor delays. The mother rarely allowed for or provided her child with opportunities to practice communication or motor skills (e.g., request a toy, self-feed, hold a book). The focus of the intervention was to have the child sign “more” and self-feed.

The provider rates of behavior that increased from the beginning sessions to the end sessions were: (a) “prompts participation,” (b) “provides caregiver general feedback,” (c) “demonstrates strategy,” (d) “uses wait time with child,” (e) “initiates discussion,” and (f) “asks caregiver interpretive questions.” The provider rates of behavior that decreased from the beginning sessions to the end sessions were: (a) “observes caregiver-child interactions,” (b) “explains embedded intervention, (c) “arranges environment for caregiver and child,” (d) “responds contingently to

child,” and (e) “responds to caregiver questions.” There were four rates of provider behavior that were unchanged: (a) “provides caregiver explicit feedback,” (b) “uses expansion with child,” (c) “asks caregiver self-evaluative questions,” and (d) “asks caregiver reflective questions.” The caregiver rates of behavior that increased from the beginning sessions to the end sessions were: (a) “observes provider,” (b) “explains embedded intervention,” (c) “prompts child participation,” (d) “provides child explicit feedback,” (e) “uses wait time with child,” and (f) “responds to provider questions.” Caregiver rates of behavior that decreased were: (a) “provides child general feedback,” (b) “demonstrates strategy,” (c) “arranges environment for child,” (d) “responds contingently to child,” and (e) “initiates discussion.” One rate of caregiver behavior was unchanged: (a) “uses expansion with child.” The graph below depicts rates of behavior for the beginning, middle, and end intervention sessions for Dyad 4.

Figure 4*Changes in Rates of Behavior: Dyad 4*

V. DISCUSSION

Remarkably few studies have examined associations between provider instructional strategies and caregiver use of intervention strategies during EI home visits, and no studies could be located that looked at specific associations between adult behaviors that occur during triadic home visits. The purpose of this study was to address the need for research that examines the reciprocal effects of adult interactions and offers a way to assess the associated practices in triadic home visits. To address these gaps, an extensive revision of the content, format, and coding procedures of the *Triadic Intervention and Evaluation Rating Scale (TIERS)* was undertaken to improve its utility and effectiveness as a measure of provider-caregiver interactions in home-based early intervention settings. Several phases of this study were devoted to the revision process. The *TIERS-R* was then used in this study to provide a preliminary analysis of sequential adult behaviors as they occurred during EI home visits, as well as an assessment of how adult behaviors changed over time. The resulting content revisions were consistent with current EI literature and recommended practice (e.g., Friedman et al., 2012; Roberts & Kaiser, 2012; Woods et al., 2018). Format and scoring procedures were revised to capture a richer description of adult interactions that occur in triadic home visits. Application of the *TIERS-R* using a small-scale evaluation found that the tool is capable of identifying specific reciprocal adult behaviors, in contrast to other existing measures that capture only unidirectional behaviors or the frequency with which providers implement coaching practices (e.g., Campbell & Sawyer, 2004; McBride & Peterson, 1997). Further analysis of triadic home visit videotapes using the *TIERS-R* revealed three key findings: (a) the *TIERS-R* revised items are relevant to what occurs during triadic home visiting and are observable and measurable; (b) several specific provider behaviors are strongly sequentially associated with specific caregiver

behaviors; and (c) the frequency of some provider and caregiver behaviors implemented during home visits changed from the dyads' beginning to end EI sessions.

***TIERS-R*: Relevant, Observable, and Measurable**

The *TIERS-R* items are relevant to what occurs during triadic home visiting and are observable and measurable. With respect to relevance, the high I-CVI scores obtained from the administration of the *CVF* in Phase 2 for the initial design of the *TIERS-R* indicated that the expert panel agreed that the items were relevant to triadic home visiting. All but one of the 14 provider items had a I-CVI of .78 or higher for relevance, and all but two of the 13 caregiver items had a I-CVI of .78 or higher for relevance. A total of 12 of the 27 items scored a perfect I-CVI of 1.00 for relevance while only three items (i.e., "provider leads discussion," "caregiver asks interpretive questions," and "caregiver responds to questions") did not meet the I-CVI threshold of .78. Furthermore, feedback from the expert panel did not lead to the addition of new items previously not considered, suggesting that the *TIERS-R* is comprehensive in capturing meaningful adult interactions as they occur during EI home visits. High agreement for item relevancy among experts participating in this study indicates that the initial content revisions were reflective of current research and practice.

Item clarity was evaluated and scored during the content validation of the initial *TIERS-R* and the expert panel expressed a pattern of strong agreement that the items were clear. With respect to observability and measurability, all but one of the 14 provider items had clarity scores of 3.0 or above, and all but two caregiver items had clarity scores of 3.0 or above on the *CVF*. Further, all five practitioners reported the *TIERS-R* items to be observable and measurable ($M = 4.2$) on the *UFS* administered in Phase 3. Additionally, the two raters who coded approximately 630 minutes of video and responded to the *UFS* either agreed or strongly agreed that the *TIERS-R* items were

observable and measurable. However, inter-rater agreement, while exceeding the threshold of acceptability, demonstrated that raters did not always code the same behavior as the reference rater, indicating the difficulty of simultaneously observing and recording two sets of adult behaviors. In addition, it is also possible that a few item definitions need further refinement for clarity.

Sequential Associations of Adult Behaviors

The most frequently observed provider behaviors in the small-scale evaluation study were: (a) observes caregiver-child interactions ($f_o = 432$), (b) initiates discussion ($f_o = 428$), (c) responds contingently to child ($f_o = 185$), and (d) provides caregiver general feedback ($f_o = 181$). In contrast, the provider only “ask[ed] caregiver self-evaluative questions” two times, “use[ed] expansion with child” six times, and “explain[ed] embedded intervention” seven times across all intervention home visits and dyads. One possible reason for infrequent recording of certain provider behaviors may be that some behaviors could meet more than one item definition. The most frequently observed caregiver behaviors were: (a) “responds contingently to child” ($f_o = 587$), (b) “prompts child participation” ($f_o = 545$), (c) “demonstrates strategy” ($f_o = 415$), and (d) “responds to provider questions” ($f_o = 242$). Two of the caregiver behaviors were not observed at all: (a) “asks provider reflective questions,” and (b) “asks provider interpretive questions.” Perhaps if the intervention had lasted longer than EPIC’s intervention timeframe (≈ 8 total sessions/dyad), caregivers would have had more opportunities to learn and implement more complex practices. Other infrequently observed caregiver behaviors were: (a) “explains embedded intervention” ($f_o = 4$) and (b) “uses expansion with child” ($f_o = 6$). Yule’s Q values were not considered to be meaningful for low frequency behaviors. Behaviors or sequences with an expected frequency less than 5 were not considered for discussion. Strongly associated provider and caregiver behaviors suggest that the

implementation of a specific provider practice was followed by a specific caregiver practice beyond chance.

Strong association for provider to caregiver sequences are discussed below. “Initiates discussion” followed by “responds to provider questions” was the strongest positive association revealed in the analysis. This sequence likely had a high Yule’s Q because the caregivers’ responding reflected a common behavior that would occur in most interpersonal interactions. Another strong association was found between “provides caregiver general feedback” followed by “provides child general feedback.” Possibly both provider and caregiver were responding to the same event during the EI session, such as the child achieving a target goal. A strong sequential association was also observed between “observes caregiver-child interactions” followed by “arranges environment for child.” This supports Brown and Woods’ (2016) findings that provider observation can often lead to the caregiver’s implementation of intervention strategies. In triadic interventions, it is expected that the provider will observe caregiver-child interactions, thus allowing the caregiver the time and opportunity to implement newly learned strategies in authentic contexts. Finally, the sequence “provides caregiver explicit feedback” followed by “demonstrates strategy” showed a moderate to strong association. It is expected that when the provider effectively implements a coaching strategy, such as providing caregiver with explicit feedback, the caregiver’s use of intervention strategies would increase (e.g., Brown & Woods, 2016; Ciupe & Salisbury, 2020; Meadan et al., 2016). There were no unexpected strong negative associations for provider and caregiver sequences.

Strong associations are discussed below for caregiver to provider sequences. “Responds to provider questions” followed by “observes caregiver-child interactions” was one of the more strongly associated caregiver to provider behavior sequences. A possible explanation of this

sequence is that the caregiver's response was the conclusion to a verbal interaction and then both adults transitioned to the child. Alternatively, it could be that the caregiver responded by saying, "I'll give that a try," and then the provider observed the caregiver implementing the discussed strategy. Another sequence with a strong association was "demonstrates strategy" followed by "provides caregiver explicit feedback." This sequence likely had a strong association because caregiver coaching, the framework used for conducting these intervention home visits, involves the provider offering the caregiver specific and explicit instruction and reinforcement that can improve the caregiver's implementation of a practice and/or the caregiver-child interaction (Friedman et al., 2012).

Adult Behaviors Over Time

Changes in provider and caregiver behaviors from beginning to end sessions varied across the four dyads. These changes generally reflected the provider's decreased use of direct teaching strategies and caregivers taking a more active role as home visits progressed, but in ways that differed across the four dyads.

Provider rates of behavior that increased from beginning EI sessions to end sessions in three out of the four dyads include: (a) "provides caregiver general feedback," (b) "asks caregiver interpretive questions," and (c) "responds to caregiver questions." The provider increase in general feedback may be a result of the provider giving supportive affirmation in later sessions for caregivers' adoption of strategies learned in early sessions. However, it should be noted that for the three dyads that it did increase, the increases were minor. It is likely that over the course of the intervention sessions, the provider felt the caregiver was more capable of answering interpretive questions that required the caregiver to strategize ways to embed learning opportunities across

people and settings between home visits. The increase in “provider responds to caregiver questions” was probably due to caregivers’ increased use of the practice “initiates discussion.”

Provider rates of behavior that decreased from beginning to end EI sessions in three out of the four dyads include: (a) “explains embedded instruction,” (b) “prompts participation,” (c) “provides caregiver explicit feedback,” and (d) “responds contingently to child.” A possible explanation for the decrease in providers’ explanation of embedded instruction is that it could be viewed as repetitive. Once providers and caregivers had discussed who, what, when, where, and how targets and strategies could be implemented, some did not find it necessary to revisit the topic during each home visit. “Prompts participation” and “caregiver explicit feedback” likely declined from beginning to end sessions because caregivers required less directive coaching. Specifically, the provider likely implemented these two behaviors less frequently in later sessions because, as other studies have confirmed, caregivers generally increase their use of strategies once they are exposed to coaching (e.g., Brown & Woods, 2015; Ciupe & Salisbury, 2020; Meadan et al., 2016). This was particularly true for Dyads 1 and 3 in which the caregivers were more successful in adopting and implementing strategies learned in the earlier sessions. With respect to the decrease in “responds contingently to the child,” it would be expected that once caregiver-child interactions increased, the provider would have fewer opportunities to interact with the child. Provider rates of behavior that were unchanged in three of the four dyads were: (a) “uses expansion with child” and (b) “asks caregiver self-evaluative questions.”

One caregiver behavior increased across all four dyads from beginning to end sessions: “caregiver provides child explicit feedback.” It is expected that after receiving coaching, caregivers adopt behaviors that are supportive of child learning and development (Douglas et al., 2020). Caregiver rates of behavior that increased from beginning EI sessions to end sessions in three out of

the four dyads were: (a) “prompts child participation,” (b) “initiates discussion,” and (c) “responds to provider questions.” One explanation for the increase in “prompts participation” may be the caregivers’ heightened capacity to lead during later home visits (e.g., Ciupe & Salisbury, 2020). The increases were substantial for the three dyads, and the dyad that did not show an increase for this behavior had a high initial rate. Caregivers likely increased their use of “initiates discussion” and “responds to provider questions” as provider-caregiver relationships evolved from unidirectional to more collaborative.

Caregiver rates of behavior that decreased from beginning to end EI sessions in three of the four dyads were: (a) observes provider and (b) demonstrates strategy. A decrease in observing the provider likely reflects the caregiver taking a more active role after having received coaching and implementing practices themselves. While one might expect to see an increase in the caregiver demonstrating strategies, this finding could be explained by the caregiver demonstrating more specific behaviors included in the *TIERS-R*, such as arranging the environment and using wait time. Two caregiver behaviors remained unchanged in three of the four dyads: (a) explains embedded intervention and (b) uses expansion with child.

Limitations

There are several limitations present in this study that should be acknowledged. Because the sample size of this study was small and only a subsample of the EPIC study was used, the results for sequential associations between adult behaviors and changes in adult behaviors over time should be considered preliminary. Three key limitations are discussed below.

First, the sample size limits the generalizability of the findings due to the small number and variability of dyads in the secondary data. The secondary data, or extracted videotaped segments from the EPIC study, included four caregiver-child dyads across all segments. This small sample

was likely not wholly representative of the families who commonly participate in triadic intervention. Only families who lived in an urban Illinois environment were part of the study, which minimizes the generalizability of findings to families living in other communities. Additionally, the short duration of the intervention phase, as well as the 630 minutes of video used to evaluate adult interactions, limited the inferences that could be drawn from the Yule's Q values calculated in the analysis, particularly given the 729 possible sequences in the 27-behavior matrix. Adult behaviors might have changed more or in more profound ways had the length of the intervention phase been longer. Coding of additional video may have produced more data regarding behavior frequency and behavior sequences, allowing for a more in-depth descriptive analysis of how adult behaviors change over time.

Second, some *TIERS-R* coding procedures may have affected the extent to which the data captured what occurs during adult interactions in EI home visits. The selected 10-second time window for coding 'initiating to responsive behaviors' may have been too long, which might result in the inclusion of some behaviors that were not, in fact, responsive to a preceding behavior. On the other hand, it could be argued that the 10-second time window was not long enough. A caregiver might need more time to process and respond to caregiver coaching strategies and then execute observable development-promoting behaviors as intended/coached. Also, coding behaviors of two participants (provider and caregiver) simultaneously can be challenging for the coders to efficiently code every occurrence of both provider and caregiver behaviors.

Third, in the analysis of inter-rater agreement it was discovered that there were small clusters of behaviors that were included in the *TIERS-R* that the rater and reference rater coded differently. It is likely that the definitions of the items in those clusters were not sufficiently unique to result in higher agreement. This may have been due to the length of some item definitions.

Lengthy item definitions can be either misread or misinterpreted by coders, therefore causing a drift between coders (McCoach et al., 2013). One other limitation of the definitions is that some describe process or continuous behaviors, and some behaviors are finite. For example, observation is a process behavior and coders were instructed to code the behavior once it was completed. In some instances, this might have led to a caregiver behavior appearing to have happened before the associated provider behavior while in reality the opposite was true. An example of a finite behavior would be “uses expansion with the child.” The caregiver might expand on the child’s language by adding a single word to the child’s utterance.

Lastly, the two raters completed the *UFS* after coding 630 minutes of video of EI home visits using the final *TIERS-R* and its accompanying materials. Therefore, only these two raters provided utility and clarity feedback on the final iteration of the tool providing very preliminary evidence about the *TIERS-R*’s relevance, observability, and measurability.

Implications for Future Research

This study produced several implications for future research. The *TIERS-R* provides a tool that can be used in future research to explore sequential relationships between provider and caregiver behaviors and their progressions over time using a larger sample size and a more extensive data set. Specifically, a larger data set might include more participants with a greater variety of demographics and more video from longer intervention phases. A wider variety of demographics would enable researchers to identify which behavior sequences are universal and which are common to and among families that share similar characteristics. This could lead to providers being able to prioritize strategies based on the specific and individual needs of the families. A larger data set would also allow for examination of how sequential associations might differ across different routines (e.g., play and caregiving routines). Also, multi-step sequences

could be explored providing an even thicker description of the reciprocal nature of adult interactions. Further, the longer intervention would allow for a more in-depth look at how behaviors change over time. For example, the *TIERS-R* could be used to examine whether caregivers independently implement development-promoting behaviors in later EI home visits that were not frequently observed without provider coaching in earlier sessions. This extended research should be useful in advancing the field's understanding of which provider behaviors or specific instructional strategies are associated with caregiver use of specific development-promoting behaviors. The *TIERS-R* could also be used to examine hypotheses about particular adult behaviors of interest to researchers. For example, researchers may want to explore a hypothesis about whether there is a sequential association between provider observation and specific caregiver strategies that are child-directed, such as expansion, wait time, and environmental arrangement. Additionally, future research might focus on refining the few item definitions that appeared to be ambiguous based on the inter-rater agreement analysis. Further, segmenting the items into process behaviors and finite behaviors might help pinpoint which types of behaviors were more prone to inter-rater non-agreement, and could therefore be useful in training raters. Another future refinement would be to address the issue described above of the coding of continuous/ongoing behaviors. These refinement might enhance the usefulness of the *TIERS-R* as a research and a practice tool.

Implications for Practice

There are several implications arising from this investigation for practice with EI providers and caregivers. First, further sequential analysis using the *TIERS-R* may lead to new understandings of what providers should prioritize during home visits in order to encourage desired caregiver behaviors, thereby enhancing the training of providers. Second, the *TIERS-R*, as checklist, may be a valuable tool for providers to evaluate their own performance and for

supervisors to evaluate provider implementation of evidence-based practices during EI home visits. Providers could potentially use the *TIERS-R* not only to assess their own use of strategies, but also as a means for identifying caregiver behaviors as they occur during EI home visits to ensure their intervention sessions are meaningful and effective. This self-assessment might advance providers' implementation of evidence-based practices leading to improved quality home visiting. As suggested by several of the practitioners who completed the *UFS*, programs might use the *TIERS-R* as an annual review tool to assess their providers. Third, based on the expert panel's validation of the relevance and clarity of the *TIERS-R*, it could be used as a training tool at the university level to identify provider behaviors that are recommended practices as well as caregiver behaviors that are supportive of child learning and development. The administration manual provides additional material, including examples of all 29 behaviors, that would supplement its utility as a training instrument. With sufficient instruction, the items, definitions, and examples should be understandable by any qualified provider. This instruction could be either web-based modules or in-person.

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APPENDICES

APPENDIX A

Faculty/Researcher Letter of Invitation

DATE: June 17, 2019

TO: Prospective Faculty/Researcher Expert Panel Member

FROM: Kierstin Moddelmog, ABD Student, Department of Special Education, University of Illinois-Chicago

You are being invited to participate as an Expert Panel member in a dissertation research study called the “*Analysis of Triadic Transactional Interactions in Early Intervention Home Visits.*” The purpose of this study is to revise an existing measure (the *Triadic Intervention and Evaluation Rating Scale*) (*TIERS*) which is used to evaluate adult interactions during early intervention (EI) home visits. The aim of the study is to update and improve the tool’s content and format and, in the process, make it better able to capture reciprocal adult interactions. The revised *TIERS* (*TIERS-R*) will be evaluated to determine the extent to which the tool captures reciprocal adult behaviors.

If you have questions, please don’t hesitate to contact me via email

[REDACTED]. I really hope you’ll have a few minutes to participate!

APPENDIX A (continued)**ABSTRACT**

The *Triadic Intervention and Evaluation Rating Scale (TIERS)* was initially developed to assess adult interaction patterns during triadic intervention home visit sessions. The *TIERS* is a unidimensional, 3-point scale that correlates provider behaviors with caregiver participation levels within a single routine. The scale was designed to measure the frequency with which certain behaviors were implemented and capture the role of the provider, caregiver, and child. Provider behaviors were based on four transactions styles: (1) observation and information sharing, (2) joint interaction and problem solving, (3) practice with feedback and reflection, and (4) direct teaching and guided practice (Basu, 2007). Conceptual and structural revisions will be made to improve the tool's ability to capture direct associations between provider-caregiver behaviors, as well as the dynamic nature of adult interactions. I intend to revise, test, and evaluate the *TIERS-R* items to reflect current evidence-informed practices and reformat the design so that reciprocal adult behaviors or shifts in behaviors can be identified. To evaluate the *TIERS-R*'s ability to capture a richer description of interdependencies in adult behaviors within early intervention sessions, trained raters will then code video of triadic home visits from a previously collected data set from a federally funded research project. These raters will also be asked to provide evaluative feedback about using the *TIERS-R*.

APPENDIX A (continued)
Practitioner Letter of Invitation

DATE: June 17, 2019

TO: Prospective Practitioner Expert Panel Member

FROM: Kierstin Moddelmog, ABD Student, Department of Special Education, University of Illinois-Chicago

You are being invited to participate in a research study called the “***Analysis of Triadic Transactional Interactions in Early Intervention Home Visits***.” The purpose of this study is to revise an existing measure (the *Triadic Intervention and Evaluation Rating Scale*) (*TIERS*) which is used to evaluate adult interactions during early intervention (EI) home visits. The aim of the study is to update and improve the tool’s content and format and, in the process, make it better able to capture reciprocal adult interactions. The revised *TIERS* (*TIERS-R*) will be evaluated to determine the extent to which the tool captures reciprocal adult behaviors. A small-scale evaluation study will be conducted to establish the feasibility, utility, and perceived relevance of the *TIERS-R* for measuring the nature of and changes in adult interactions over time. Your evaluative feedback will provide essential expert opinion about the items and format of the *TIERS-R*. I am asking you to complete three on-line tasks, all of which are expected to take no more than 60 minutes: 1) review the draft *TIERS-R* scale, 2) complete a demographic form, and 3) provide input on the item content and scale format using an on-line survey. In addition, I am asking you to attend a face-to-face OR virtual feasibility testing session during which you will watch and code two, 10-minute videos of EI home visits using the *TIERS-R*. You will receive some *TIERS* materials to review prior to the feasibility testing session. The session will be held at UIC at a time convenient for everyone (n=5) on the practitioner panel or will be conducted individually via Skype. The session will last approximately 2 hours. You will receive a \$300 Visa gift card for 1) completing the survey within one week of receiving the survey, AND 2) participating in the feasibility testing session within two weeks of receiving the *TIERS-R* material. You will receive a \$50 Visa gift card if you choose to only complete the survey within one week of receiving the survey.

If you have questions, please don’t hesitate to contact me via email

[REDACTED]. I really hope you’ll have a few minutes to participate!

APPENDIX A (continued)**ABSTRACT**

The *Triadic Intervention and Evaluation Rating Scale (TIERS)* was initially developed to assess adult interaction patterns during triadic intervention home visit sessions. The *TIERS* is a unidimensional, 3-point scale that correlates provider behaviors with caregiver participation levels within a single routine. The scale was designed to measure the frequency with which certain behaviors were implemented and capture the role of the provider, caregiver, and child. Provider behaviors were based on four transactions styles: (1) observation and information sharing, (2) joint interaction and problem solving, (3) practice with feedback and reflection, and (4) direct teaching and guided practice (Basu, 2007). Conceptual and structural revisions will be made to improve the tool's ability to capture direct associations between provider-caregiver behaviors, as well as the dynamic nature of adult interactions. I intend to revise, test, and evaluate the *TIERS* items to reflect current evidence-informed practices and reformat the design so that reciprocal adult behaviors or shifts in behaviors can be identified.

To evaluate the content validity of the *TIERS-Revised (TIERS-R)*, I am asking members of my expert panel to provide evaluative feedback regarding the relevance and clarity of the updated items, as well as the readability and efficiency of the reformatted design of the tool. To evaluate the *TIERS-R*'s ability to capture a richer description of interdependencies in adult behaviors within early intervention sessions, trained raters will then code video of triadic home visits from a previously collected data set from a federally funded research project. These raters will also be asked to provide evaluative feedback about using the *TIERS-R*. By improving upon a scale that assesses provider-caregiver interactions, I hope to expand the field's understanding of how what providers do impacts caregivers' knowledge and interactions with their children.

APPENDIX B

Content Validation Form

Instructions: Please rate each item's clarity and relevance by highlighting or circling: **1** (not clearly worded, not relevant to early intervention home visits), **2** (somewhat clearly worded, somewhat relevant to early intervention home visits), **3** (clearly worded, relevant to early intervention home visits), **4** (very clearly worded, very relevant to early intervention home visits) in each box.

Provider Items/Behaviors¹	Operational Definition	Item Clarity 1-2-3-4	Item Relevance 1-2-3-4
1. Observes another/others	Provider visually orients and watches the caregiver in a routine, activity, or interaction with the child without verbally or physically interrupting.	1 2 3 4	1 2 3 4
2. Explains embedded instruction	Provider describes when, where, and/or how to embed a specific teaching strategy into an authentic daily routine.	1 2 3 4	1 2 3 4
3. Prompts participation	Provider intentionally cues caregiver or child to actively engage in a meaningful and functional activity.	1 2 3 4	1 2 3 4
4. Provides feedback	Provider offers caregiver constructive comments or suggestions to improve the activity outcome and/or child development.	1 2 3 4	1 2 3 4
5. Demonstrates strategy	Provider models a target strategy simultaneously narrating what he/she is doing while the caregiver watches.	1 2 3 4	1 2 3 4
6. Expands ideas/actions	Provider scaffolds or builds upon caregiver ideas or actions to enhance or increase learning opportunities.	1 2 3 4	1 2 3 4
7. Arranges environment	Provider intentionally organizes the space or situation to promote skill development.	1 2 3 4	1 2 3 4
8. Responds contingently to child	Provider repeats/replicates the child's utterance or movement without remarking or clarifying.	1 2 3 4	1 2 3 4
9. Uses wait time with child	Provider presents the child with a desirable object and provides a fixed amount of time for the child to verbally or physically respond. OR the provider waits for the child to initiate communication during an interaction.	1 2 3 4	1 2 3 4
10. Leads discussion	Provider verbally initiates an interaction with the caregiver.	1 2 3 4	1 2 3 4
11. Asks self-evaluative questions	The provider asks the caregiver questions that require the caregiver to assess his/her ability to implement newly learned strategies or embed instruction into his/her authentic daily routines.	1 2 3 4	1 2 3 4

APPENDIX B (continued)

12. Asks reflective questions	Provider asks the caregiver WHY a strategy or routine did or did not go well.	1 2 3 4	1 2 3 4
13. Asks interpretive questions	Provider asks caregiver HOW/IN WHAT WAYS strategies might be incorporated in family's routines/activities	1 2 3 4	1 2 3 4
14. Responds to questions	Provider directly and relevantly responds to the caregiver's questions.	1 2 3 4	1 2 3 4
Caregiver Items/Behaviors	Operational Definition	Item Clarity 1-2-3-4	Item Relevance 1-2-3-4
1. Observes another/others	Caregiver visually orients and watches the provider in a routine, activity, or interaction with the child without verbally or physically interrupting.	1 2 3 4	1 2 3 4
2. Explains embedded instruction	Caregiver describes when, where, and/or how to embed a specific teaching strategy into an authentic daily routine.	1 2 3 4	1 2 3 4
3. Prompts participation	Caregiver intentionally cues child to actively engage in a meaningful and functional activity.	1 2 3 4	1 2 3 4
4. Provides feedback	Caregiver offers child constructive comments or suggestions to improve the activity outcome and/or child development.	1 2 3 4	1 2 3 4
5. Demonstrates strategy	Caregiver models a target strategy for the child simultaneously narrating what he/she is doing while the provider watches.	1 2 3 4	1 2 3 4
6. Uses expansion	Caregiver scaffolds or builds upon child behaviors to enhance or increase learning opportunities.	1 2 3 4	1 2 3 4
7. Arranges environment	Caregiver intentionally organizes the space or situation to promote skill development.	1 2 3 4	1 2 3 4
8. Responds contingently to child	Caregiver repeats/replicates the child's utterance or movement without remarking or clarifying.	1 2 3 4	1 2 3 4
9. Uses wait time with child	Caregiver presents the child with a desirable object and provides a fixed amount of time for the child to verbally or physically respond. OR the caregiver waits for the child to initiate communication during an interaction.	1 2 3 4	1 2 3 4
10. Leads discussion	Caregiver verbally initiates an interaction with the provider.	1 2 3 4	1 2 3 4
11. Asks reflective questions	Caregiver asks the provider WHY a strategy or routine did or did not go well.	1 2 3 4	1 2 3 4

APPENDIX B (continued)

12. Asks interpretive questions	Caregiver asks provider HOW/IN WHAT WAYS strategies might be incorporated in family routines/activities.	1 2 3 4	1 2 3 4
13. Responds to questions	Caregiver directly and relevantly responds to the provider's questions.	1 2 3 4	1 2 3 4

¹ Wording of some items was drawn from "Collaborative coaching with Early Head Start teachers using responsive communication strategies," by M. Romano and J. Woods, 2018, *Topics in Early Childhood Special Education*, 38, 30-41.

Please answer the following questions to provide supplemental feedback about the *TIERS-R*.

Is the layout of the *TIERS-R* clearly organized? If not, what would you change to improve the overall design?

Do you believe the *TIERS-R* items cover adult behaviors that typically occur during early intervention home visits? **YES NO**

Do you have any recommendations for improving the content coverage?

Rater/Practitioner User Feedback Survey

[illegible][illegible]

APPENDIX C (continued)

Please answer the following question to provide supplemental feedback about the *TIERS-R*.

1. Can you use the *TIERS-R* during home visits as it is currently designed? If not, what would you change about the *TIERS-R* so that you would use it to assess your day-to-day coaching practices?

APPENDIX D

Triadic Intervention and Evaluation Rating Scale-Revised (*TIERS-R*)
(Original)

Name: _____ Rater: _____ Date: _____ Routine: _____ Intervention Session #: _____

Provider and Caregiver Behaviors

Provider Items/Behaviors¹	Operational Definition
1. Observes another/others	Provider visually orients and watches the caregiver in a routine, activity, or interaction with the child without verbally or physically interrupting.
2. Explains embedded instruction	Provider describes when, where, and/or how to embed a specific teaching strategy into an authentic daily routine.
3. Prompts participation	Provider intentionally cues caregiver or child to actively engage in a meaningful and functional activity.
4. Provides feedback	Provider offers caregiver constructive comments or suggestions to improve the activity outcome and/or child development.
5. Demonstrates strategy	Provider models a target strategy simultaneously narrating what he/she is doing while the caregiver watches.
6. Expands ideas/actions	Provider scaffolds or builds upon caregiver ideas or actions to enhance or increase learning opportunities.
7. Arranges environment	Provider intentionally organizes the space or situation to promote skill development.
8. Responds contingently to child	Provider repeats/replicates the child's utterance or movement without remarking or clarifying.
9. Uses wait time with child	Provider presents the child with a desirable object and provides a fixed amount of time for the child to verbally or physically respond. OR the provider waits for the child to initiate communication during an interaction.
10. Leads discussion	Provider verbally initiates an interaction with the caregiver.
11. Asks self-evaluative questions	The provider asks the caregiver questions that require the caregiver to assess his/her ability to implement newly learned strategies or embed instruction into his/her authentic daily routines.

APPENDIX D (continued)

12. Asks reflective questions	Provider asks the caregiver WHY a strategy or routine did or did not go well.
13. Asks interpretive questions	Provider asks caregiver HOW/IN WHAT WAYS strategies might be incorporated in family's routines/activities.
14. Responds to questions	Provider directly and relevantly responds to the caregiver's questions.
Caregiver Items/Behaviors	Operational Definition
1. Observes another/others	Caregiver visually orients and watches the provider in a routine, activity, or interaction with the child without verbally or physically interrupting.
2. Explains embedded instruction	Caregiver describes when, where, and/or how to embed a specific teaching strategy into an authentic daily routine.
3. Prompts participation	Caregiver intentionally cues child to actively engage in a meaningful and functional activity.
4. Provides feedback	Caregiver offers child constructive comments or suggestions to improve the activity outcome and/or child development.
5. Demonstrates strategy	Caregiver models a target strategy for the child simultaneously narrating what he/she is doing while the provider watches.
6. Uses expansion	Caregiver scaffolds or builds upon child behaviors to enhance or increase learning opportunities.
7. Arranges environment	Caregiver intentionally organizes the space or situation to promote skill development.
8. Responds contingently to child	Caregiver repeats/replicates the child's utterance or movement without remarking or clarifying.
9. Uses wait time with child	Caregiver presents the child with a desirable object and provides a fixed amount of time for the child to verbally or physically respond. OR the caregiver waits for the child to initiate communication during an interaction.
10. Leads discussion	Caregiver verbally initiates an interaction with the provider.

APPENDIX D (continued)

11. Asks reflective questions	Caregiver asks the provider WHY a strategy or routine did or did not go well.
12. Asks interpretive questions	Caregiver asks provider HOW/IN WHAT WAYS strategies might be incorporated within family routines/activities.
13. Responds to questions	Caregiver directly and relevantly responds to the provider's questions.

¹ Wording of some items was drawn from "Collaborative coaching with Early Head Start teachers using responsive communication strategies," by M. Romano and J. Woods, 2018, *Topics in Early Childhood Special Education*, 38, 30-41.

APPENDIX E

Triadic Intervention and Evaluation Rating Scale-Revised (*TIERS-R*)
(Semi-Final)

Name: _____ Rater: _____ Date: _____ Routine: _____ Intervention Session #: _____

Provider and Caregiver Behaviors

Provider Items/Behaviors¹	Operational Definitions
1. Observes caregiver-child interactions	Provider visually orients and watches the caregiver-child interaction in activity/routine without commenting.
2. Explains embedded intervention	Provider describes what, when, where, why, and/or how to embed a specific teaching strategy (i.e., a strategy designed to build and support child development) into an authentic daily activity/routine.
3. Prompts participation	Provider cues caregiver and child to interact with one another or materials during an activity/routine.
4a. Provides caregiver explicit feedback	Provider offers constructive comments or suggestions to help the caregiver implement a strategy.
4b. Provides caregiver general feedback	Provider offers encouragement to the caregiver and child (e.g., “Yes, that’s exactly right!”).
5. Demonstrates strategy	Provider models a target strategy simultaneously narrating what he/she is doing while the caregiver watches.
6. Expands on caregiver ideas/actions	Provider scaffolds or builds upon caregiver ideas or actions to enhance or increase child learning opportunities.
7. Arranges environment for caregiver and child	Provider intentionally organizes the space or situation to increase child learning opportunities.
8. Responds contingently to child	Provider acknowledges, comments, or imitates on child’s utterances or actions immediately following the child’s behavior.
9. Uses wait time with child	Provider presents the child with a desirable object and provides a fixed amount of time for the child to respond verbally or physically. OR the provider waits for the child to respond to or initiate communication during an interaction.
10. Initiates discussion	Provider comments or asks a question that begins a turn-taking interaction with the caregiver.

APPENDIX E (continued)

11. Asks caregiver self-evaluative questions	Provider asks the caregiver questions that support the caregiver to assess his/her capacity to implement newly learned strategies or embed intervention into his/her daily activities/routines.
12. Asks caregiver reflective questions	Provider asks the caregiver WHY a strategy or activity/routine did or did not go well.
13. Asks caregiver interpretive questions	Provider asks caregiver HOW/IN WHAT WAYS strategies might be incorporated in family activities/routines.
14. Responds to caregiver questions	Provider directly responds to the caregiver's questions.
Caregiver Items/Behaviors	Operational Definition
1. Observes provider	Caregiver visually orients and watches the provider in a routine, activity, or interaction with the child.
2. Explains embedded intervention	Caregiver describes what, when, where, why, and/or how to embed a specific teaching strategy into an authentic daily activity/routine.
3. Prompts child participation	Caregiver cues child to interact with caregiver or materials in a meaningful and functional activity/routine.
4a. Provides child explicit feedback	Caregiver offers child supportive or constructive comments or suggestions following the child's actions or behaviors in an activity/routine.
4b. Provides child general feedback	Caregiver offers encouragement to the child (e.g., "Yay, you did it!").
5. Demonstrates strategy	Caregiver models a target strategy when interacting with the child while the provider watches.
6. Uses expansion with child	Caregiver scaffolds or builds upon child behaviors to enhance or increase learning opportunities.
7. Arranges environment for child	Caregiver intentionally organizes the space or situation to increase child learning opportunities.
8. Responds contingently to child	Caregiver acknowledges, comments, or imitates child's utterances or actions immediately following the child's behavior.

APPENDIX E (continued)

9. Uses wait time with child	Caregiver presents the child with a desirable object and provides a fixed amount of time for the child to respond verbally or physically. OR the caregiver waits for the child to respond to or initiate communication during an interaction.
10. Initiates discussion	Caregiver comments or asks a question that begins a turn-taking interaction with the provider.
11. Asks provider reflective questions	Caregiver asks the provider WHY a strategy or routine did or did not go well.
12. Asks provider interpretive questions	Caregiver asks provider HOW/IN WHAT WAYS strategies might be incorporated in family activities/routines.
13. Responds to provider questions	Caregiver directly responds to the provider's questions.

¹ Wording of some items was drawn from "Caregiver coaching strategies for early intervention providers moving toward operational definitions," by M. Friedman, J. Woods, & C. Salisbury, 2012, *Infants & Young Children*, 25, 62–82.

APPENDIX FTriadic Intervention and Evaluation Rating Scale-Revised (*TIERS-R*)

(Final)

Provider and Caregiver Behaviors

Provider Items/Behaviors¹	Operational Definitions
1. Observes caregiver-child interactions	Provider visually orients and watches the caregiver-child interaction in activity/routine without commenting.
2. Explains embedded intervention	Provider describes what, when, where, why, and/or how to embed a specific teaching strategy (i.e., a strategy designed to build and support child development) into an authentic daily activity/routine.
3. Prompts participation	Provider verbally cues caregiver and/or child to interact with one another or materials during an activity/routine.
4a. Provides caregiver explicit feedback	Provider offers constructive comments or suggestions to improve the caregiver's ability to implement a strategy.
4b. Provides caregiver general feedback	Provider offers encouragement to the caregiver and/or child (e.g., "Yay! You signed more!") immediately following caregiver's and/or child's actions or behaviors.
5. Demonstrates strategy	Provider models a target strategy simultaneously narrating what he/she is doing while the caregiver observes.
6. Uses expansion with child	Provider scaffolds or builds upon child utterances or behaviors to enhance or increase learning opportunities.
7. Arranges environment for caregiver and child	Provider intentionally organizes the space or situation to increase child learning opportunities (e.g., situates him/herself or objects out of reach).
8. Responds contingently to child	Provider acknowledges (i.e., physically responds to child's communication efforts) or comments (i.e., verbally responds to child's communication efforts) on child's attempt or execution of target behaviors OR imitates child's utterances or actions immediately following the child's behavior.
9. Uses wait time with child	Provider presents the child with a desirable object and provides a fixed amount of time for the child to respond verbally or physically. OR the provider waits for the child to respond to or initiate communication during an interaction.

APPENDIX F (continued)

10. Initiates discussion	Provider comments or asks a question to begin a turn-taking interaction with the caregiver.
11. Asks caregiver self-evaluative questions	Provider asks the caregiver questions that support the caregiver to assess his/her capacity to implement newly learned strategies or to embed intervention into his/her daily activities/routines.
12. Asks caregiver reflective questions	Provider asks the caregiver WHY a strategy or activity/routine did or did not go well/work.
13. Asks caregiver interpretive questions	Provider asks caregiver HOW/IN WHAT WAYS strategies might be implemented or incorporated in family activities/routines.
14. Responds to caregiver questions	Provider directly responds to the caregiver's questions OR initiated discussion.
Caregiver Items/Behaviors	Operational Definition
1. Observes provider	Caregiver visually orients and watches the provider in a routine, activity, or interaction with the child.
2. Explains embedded intervention	Caregiver describes what, when, where, why, and/or how to embed a specific teaching strategy into an authentic daily activity/routine.
3. Prompts child participation	Caregiver verbally cues child to interact with caregiver or materials in a meaningful and functional activity/routine.
4a. Provides child explicit feedback	Caregiver offers child supportive or constructive comments or suggestions immediately following the child's actions or behaviors in an activity/routine.
4b. Provides child general feedback	Caregiver offers encouragement to the child (e.g., "Yay, you did it! You walked two steps!") immediately following child's actions or behaviors.
5. Demonstrates strategy	Caregiver models a target strategy when interacting with the child while the provider observes.
6. Uses expansion with child	Caregiver scaffolds or builds upon child utterances or behaviors to enhance or increase learning opportunities.

APPENDIX F (continued)

7. Arranges environment for child	Caregiver intentionally organizes the space or situation to increase child learning opportunities (e.g., situates him/herself or objects out of reach).
8. Responds contingently to child	Caregiver acknowledges, comments, or imitates child's utterances or actions immediately following the child's behavior.
9. Uses wait time with child	Caregiver presents the child with a desirable object and provides a fixed amount of time for the child to respond verbally or physically. OR the caregiver waits for the child to respond to or initiate communication during an interaction.
10. Initiates discussion	Caregiver comments or asks a question to begin a turn-taking interaction with the provider.
11. Asks provider reflective questions	Caregiver asks the provider WHY a strategy or routine did or did not go well/work.
12. Asks provider interpretive questions	Caregiver asks provider HOW/IN WHAT WAYS strategies might be implemented or incorporated in family activities/routines.
13. Responds to provider questions	Caregiver directly responds to provider self-evaluative, reflective, or interpretive questions OR initiated discussion.

¹ Wording of some items was drawn from "Caregiver coaching strategies for early intervention providers moving toward operational definitions," by M. Friedman, J. Woods, & C. Salisbury, 2012, *Infants & Young Children*, 25, 62–82.

APPENDIX F (continued)
TIERS-R Administration Manual

***TIERS-R* ADMINISTRATION MANUAL**

Materials Needed

- Triadic Intervention and Evaluation Rating Scale-Revised (*TIERS-R*)
- *TIERS-R* Coding Form
- Video segments of EI triadic home visits
- Pencil

Coding Protocol Summary

The aim of this study is to better understand **adult-adult interactions** within home visits and what happens as a result of those interactions. Interactions can be initiated by EITHER adult (provider or caregiver), and EITHER adult may respond to the initiation of the other. On-going interactions create a sequential series of behaviors that impact the actions or decisions of adults who are involved in the series of interactions. The cyclical nature of these interactions is referred to as a **transaction**. You will be coding adult interactions and transactions that occur during EI home visits using videotapes of home visit sessions.

In this study, your task is to code transactional interactions that occur within an authentic daily routine during an early intervention home visit. A **daily routine** is a meaningful and predictable series of events in which there is an identifiable child outcome. Routines have a clear beginning and end and evidence repetition either within the activity itself (e.g., self-feeding, putting away toys, dancing) or throughout the day/week (e.g., meals, taking a bath, playing with blocks, reading a story) (Florida State University, 2014). As you watch the video segments of home visits, you will code each observed adult behavior, as well as the result of that behavior, using the instructions in this manual.

Coding Adult Interactions and Transactions

The data collection form is a table in which observed adult behaviors will be coded with operationally defined terms and the time behaviors were observed. Those definitions and their abbreviations (used for coding) are represented in Table 2. Refer to the sample of a completed data collection form below. Each vertical column (**C, column**) represents a sequential series of adult behaviors (**transactions**) that you will code. The rows within each column are used to represent the sequential nature of adult interactions during the home visit. The first row is titled **BI, the initiating behavior** of the interaction or transaction. Subsequent rows are titled **BR, the responsive behavior** that occurred following an adult initiation or the previous responsive behavior. The first observed adult behavior in the video should be coded in the C1-BI box using the interaction abbreviation codes listed in Table 2 below the data collection form example. In addition to recording the behavior, record the time at which the first, or initiating behavior was observed in the first “**Time Code**” box. All sequential responses that occur within 10 seconds of each other should be vertically coded in the same column, as well as the time the responsive behaviors were observed, until there is a time violation (i.e., the responsive behavior doesn’t occur within 10 seconds of the previously observed behavior) or a distraction occurs (e.g., dog barks, doorbell rings, sibling needs caregiver attention). When a time violation or distraction occurs, shift to the column to the right and code the next observed behavior in the BI row and continue the coding process as described.

APPENDIX F (continued)

For example, in Table 1, the provider demonstrated a strategy (PDEM) for the caregiver seven seconds into the video segment of the triadic home visit. The rater coded this behavior using the appropriate abbreviation and recorded the time the behavior was observed. Within 10 seconds of the provider completing the demonstration, the rater observed and coded the caregiver using wait time (CWT) with her child 16 seconds into the video segment. Next, the rater observed the provider offering general feedback (PGFB) and praising the caregiver's successful use of wait time within 10-seconds following the caregiver-child interaction and coded accordingly. No adult behavior was observed within 10-seconds of the provider's general feedback, so the next observed behavior, caregiver expansion (CEX), and the time it occurred was recorded in column C-2-BI and the next "Time Code" box, respectively. The interactions and transactions continue until the end of the home visit session.

Table 1.

Data collection form example

	Time Code	C-1	Time Code	C-2	Time Code	C-3	Time Code	C-4	Time Code	C-5	Time Code	C-6
BI	:07	PDEM	:46	CEX	1:23	PPCG	2:03	CDEM	2:47	PGFB	3:17	PO
BR	:16	CWT	:50	PRTQ	1:26	CEA	2:08	X	2:55	CID	3:22	CPC
BR	:23	PGFB			1:34	PEFB			3:00	PRQ	3:31	CEX
BR					1:44	CRQ					3:34	PGFB
BR					1:49	PRTQ						
BR												

Note: Table is not to scale. There are eight columns on the *TIERS-R* coding table.

APPENDIX F (continued)

Table 2. *Code's Key: Operational Definitions of Coding Terms and Associated Abbreviations***Provider Terms and Definitions:**

INTERACTION TERMS	OPERATIONAL DEFINITIONS AND PROVIDER AND CAREGIVER EXAMPLES	Provider Codes (P)
Observes caregiver-child interactions	Provider visually orients and watches the caregiver-child interaction in activity/routine without commenting. (NO C-CG INTERACTION – NO OBSERVATION) Provider Ex. The provider says, "I'll watch while you get him ready for snack, and then we can discuss ways you think would be most helpful for his transition."	PO
Explains embedded intervention	Provider describes what, when, where, why, and/or how to embed a specific teaching strategy (i.e., a strategy designed to build and support child development) into an authentic daily activity/routine. (Note: <i>The 5 W's + H</i> : Provider must explain either what OR how to embed paired with one of the remaining W's.) Provider Ex. The provider suggests that since the child's target goal is to walk three steps and the family frequents the park, the caregiver and her husband could take that time as an opportunity to have the child walking back & forth between them on the grass.	PEI
Prompts participation	Provider verbally cues caregiver and/or child to interact with one another or materials during an activity/routine. Provider Ex. The provider tells the caregiver to sit the child facing him and initiate a game of peek-a-boo.	PPCG
Provides caregiver explicit feedback	Provider offers constructive comments or suggestions to improve the caregiver's ability to implement a strategy. Provider Ex. The provider notices that the caregiver is trying to get the child to crawl, but the child stays put. The provider says, "you told me that your child's favorite toy is a stuffed bear. Why don't you put the bear three feet in front of her to see if she crawls to it?"	PEFB
Provides caregiver general feedback	Provider offers encouragement to the caregiver and/or child (e.g., Yay! You signed more!") immediately following caregiver's and/or child's actions or behaviors. Provider Ex. The provider notices that the caregiver has successfully used contingent responding, and says, "Great job immediately imitating his vocalizations!"	PGFB
Demonstrates strategy	Provider models a target strategy simultaneously narrating what he/she is doing while the caregiver observes. Provider Ex. The provider places the child's favorite food just out of reach but within eyesight of the child during snack time. The provider explains to the caregiver that he is holding the food out of the child's reach to encourage the child to ask for it.	PDEM

APPENDIX F (continued)

Uses expansion with child	<p>Provider scaffolds or builds upon child utterances or behaviors to enhance or increase learning opportunities.</p> <p>Provider Ex. The child has consistently demonstrated that he can sign “more.” The child signs “more” for more milk during snack time, and the provider expands by signing, “more -- milk.”</p>	PEX
Arranges environment for caregiver and child	<p>Provider intentionally organizes the space or situation to increase child learning opportunities (e.g., situates a desirable toy out of reach).</p> <p>Provider Ex. The child’s target behavior is to make choices. The provider holds up two books. One book is the child’s favorite and the other book the child has never seen before. The child will point to the book of her choice in response to a verbal cue from the provider.</p>	PEA
Responds contingently to child	<p>Provider acknowledges (i.e., physically responds to child’s communication efforts) or comments (i.e., verbally responds to child’s communication efforts) on child’s attempt or execution of target behaviors OR imitates child’s utterances or actions immediately following the child’s behavior.</p> <p>Provider Ex.</p> <p>(1) <i>acknowledges</i> – the provider is standing up, and the child tugs on the provider’s arm and points to the couch. The provider contingently responds by sitting down.</p> <p>(2) <i>comments</i> – the provider stops blowing bubbles, and the child’s signs “more.” The provider comments, “Oh you want more bubbles!”</p> <p>(3) <i>imitates</i> – the child covers his eyes to play peek-a-boo, and the caregiver responds by covering his eyes.</p>	PRC
Use wait time with child	<p>Provider presents the child with a desirable object and provides a fixed amount of time for the child to respond verbally or physically. OR the provider waits for the child to respond to or initiate communication during an interaction.</p> <p>Provider Ex. The provider holds up Play-Doh in one hand and a ball in the other and waits approximately 3-4 seconds for the child to select one before asking the child which object she wants.</p>	PWT
Initiates discussion	<p>Provider comments or asks a question to begin a turn-taking interaction with the caregiver.</p> <p>Provider Ex. The provider asks the caregiver to describe what happened between home visits.</p>	PID
Asks caregiver self-evaluative questions	<p>Provider asks the caregiver questions that support the caregiver to assess his/her capacity to implement newly learned strategies or to embed intervention into daily activities/routines.</p> <p>Provider Ex. The provider asks the caregiver how confident she feels in using environmental arrangement during other activities other than mealtime.</p>	PEVQ

APPENDIX F (continued)

Asks caregiver reflective questions	Provider asks the caregiver WHY a strategy or activity/routine did or did not go well. Provider Ex. The provider asks, “Why do you think your child started to crawl when you placed the book three feet away?”	PRQ
Asks caregiver interpretive questions	Provider asks caregiver HOW/IN WHAT WAYS strategies might be implemented or incorporated in family activities/routines. Provider Ex. The provider asks the caregiver, “where are other places newly learned strategies can be implemented to increase your child’s learning opportunities?”	PIQ
Responds to caregiver questions	Provider directly responds to the caregiver’s questions or initiated discussion (with a complete thought).	PRTQ

Caregiver Terms and Definitions:

INTERACTION TERMS	CAREGIVER OPERATIONAL DEFINITIONS EXAMPLES	CG Codes (C)
Observes provider	Caregiver visually orients and watches the provider in a routine, activity, or interaction with the child. Caregiver Ex. Without commenting, the caregiver sits near the provider and child and watches the provider offer the child two choices for snack and then waits 5-seconds before asking him which one he wants.	CO
Explains embedded intervention	Caregiver describes what, when, where, why, and/or how to embed a specific teaching strategy into an authentic daily activity/routine. (Note: <i>The 5 W’s + H</i> : Caregiver must explain either what OR how to embed, and it must be paired with one of the remaining W’s.) Caregiver Ex. The caregiver explains during bath time she sets out the child’s favorite toys on the sink so he can see them and waits for him to ask for them to play with in the bath.	CEI
Prompts child participation	Caregiver verbally cues child to interact with caregiver or materials in a meaningful and functional activity/routine. Caregiver Ex. The caregiver tells the child to pick up his toys and put them in the basket.	CPC
Provides child explicit feedback	Caregiver offers child supportive or constructive comments or suggestions immediately following the child’s actions or behaviors in an activity/routine. Caregiver Ex. The caregiver notices her child is wobbling side-to-side as he tries climbing the first stair. The caregiver also notices the child is not holding on to the railing. She tells him to hold on to the railing for extra support.	CEFB
Provides child general feedback	Caregiver offers encouragement to the child (e.g., “Yay, you did it!” You walked two steps!”) immediately following child’s actions or behaviors.	CGFB

APPENDIX F (continued)

	Caregiver Ex. The child signs ‘all done’ to indicate that he was done playing with the ball. The caregiver cheered, “Yay! Good job!”	
Demonstrates strategy	Caregiver models a target strategy when interacting with the child while the provider observes. Caregiver Ex. The caregiver wants the child to sign “more.” He models the sign for ‘more.’	CDEM
Uses expansion with child	Caregiver scaffolds or builds upon child utterances or behaviors to enhance or increase learning opportunities. Caregiver Ex. (1) The child says “block.” The caregiver expands and says, “the block is yellow” or “yellow block.”	CEX
Arranges environment for child	Caregiver intentionally organizes the space or situation to increase child learning opportunities (e.g., situates him/herself or objects out of reach). Caregiver Ex. The caregiver intentionally forgets to give the child crayons and places them across the table from the child during coloring time so that the child will have to initiate a request.	CEA
Responds contingently to child	Caregiver acknowledges or comments on child’s attempt or execution of target behaviors OR imitates child’s utterances or actions immediately following the child’s behavior. Caregiver Ex. (1) <i>acknowledges</i> - The caregiver is holding a book. The child points to the book, and the caregiver hands the child the book. (2) <i>comments</i> – The child is upset and does not want to participate in the activity and says, “no, stop!” The caregiver responds, “no, you don’t want to play?” (3) <i>imitates</i> - The child babbles, “gah-guh-guh,” and the caregiver mimics, “gah-guh-guh.”	CRC
Uses wait time with child	Caregiver presents the child with a desirable object and provides a fixed amount of time for the child to respond verbally or physically. OR the caregiver waits for the child to respond to or initiate communication during an interaction. Caregiver Ex. The caregiver asks the child what he would like for snack and waits approximately 4-5 seconds. When the child does not respond during that time frame, the caregiver repeats the question.	CWT
Initiates discussion	Caregiver comments or asks a question to begin a turn-taking interaction with the provider. Caregiver Ex. The caregiver tells the provider that the child is not responding to open-ended questions and she wants to try a new strategy to advance the child’s communication skills.	CID
Asks provider reflective questions	Caregiver asks the provider WHY a strategy or routine did or did not go well/work.	CRQ

APPENDIX F (continued)

	Caregiver Ex. The caregiver asks the provider why the child gets upset when they practice working on his table-top position.	
Asks provider interpretive questions	Caregiver asks provider HOW/IN WHAT WAYS strategies might be implemented or incorporated in family activities/routines. Caregiver Ex. The caregiver asks, “How can I use environmental arrangement when I am shopping at the grocery store with my child?”	CIQ
Responds to provider questions	Caregiver directly responds to provider’s self-evaluative, reflective, or interpretive questions OR initiated discussion (with a complete thought). Caregiver Ex. The caregiver responds, “We can work on signing more when we are getting ready for bed.”	CRTQ

Additional Codes and Definitions:

Distraction	An interruption that diverts the triad from the current routine, activity, or interaction. This includes either adult leaving the activity or routine for longer than the 10-second time window. Ex. Barking dog, doorbell/phone rings, a sibling needed caregiver’s attention, etc.	X
Timing Violation	A responsive adult behavior does not occur within a 10-second time window.	Shift to column on the right

Procedures for Coding Home Visit Video**Step 1**

The first observed adult behavior is considered the initiating behavior of the transaction. Record the first, or initiating adult behavior observed in column 1 (C1), initiating behavior (BI) box, using the adult behavior abbreviations in Table 2, AND record the time the initiating behavior occurred in the first “Time Code” box.

Example PART 1A: The first behavior observed, or the initiating behavior, is the provider prompting the caregiver to interact with her child during a play routine. This behavior was observed one minute and twenty-three seconds into the video segment. The rater refers to the code’s key to identify the provider’s behavior, uses the abbreviation for ‘prompts participation’ (PPCG) to code in the C1-BI box, and records the time the behavior was observed.

	Time Code	C-1	Time Code	C-2	Time Code	C-3	Time Code	C-4	Time Code	C-5	Time Code	C-6
BI	1:23	PPCG										
BR												
BR												

Example PART 1B: The first behavior observed, or initiating behavior, is the caregiver arranging the environment by placing his/her child’s favorite toy out of reach to encourage the child to crawl. This

behavior was observed fifty-six seconds into the video segment. The rater refers to the code's key to identify the caregiver's behavior, uses the abbreviation for 'arranges environment for child' (CEA) to code in the C1-BI box, and records the time the behavior was observed.

[illegible]

Example PART 2B: The provider responds to the caregiver by telling him to move the toy closer to the child since the child has not moved. The provider has given the caregiver explicit feedback on how to improve the use of environmental arrangement. This behavior was observed one minute and four seconds into the video segment. The rater refers to the code's key to identify the provider's behavior, uses the abbreviation for 'provides caregiver explicit feedback' (PEFB) to code in the C1-BR box, and records the time the behavior was observed.

Continue to record sequential reciprocal behaviors in BR boxes in the same column until no adult behaviors occur within the 10-second time window OR there is a distraction (refer to Step 5 for instructions on recording distractions).

Example PART 3A: The provider explains to the caregiver that he/she should be at eye-level when demonstrating a strategy for their child. This explicit feedback occurs within 10 seconds of the caregiver demonstrating the spoon grasp. This behavior was observed one minute and thirty-five seconds into the video segment. The rater refers to the code's key to identify the provider's behavior, uses the abbreviation for 'provides caregiver explicit feedback' (PEFB) to code in the next C1-BR box BELOW the first responsive behavior, and records the time the behavior was observed.

Example PART 3B: The caregiver responds to the provider’s feedback within the 10-second time window and moves the toy closer to the child, rearranging the environment. This behavior was observed one minute and ten seconds into the video segment. The rater refers to the code’s key to identify the caregiver’s behavior, uses the abbreviation for ‘arranges environment’ (CEA) to code in the next C1-BR box BELOW the first responsive behavior, and records the time the behavior was observed.

[illegible]

APPENDIX F (continued)

[illegible]

Step 4

If a “time violation” occurs, meaning a reciprocal behavior does **not** occur within 10 seconds of the initiating behavior (BI) or the previous responsive behavior (BR), code the next observed behavior in the column to the right (e.g., C2-BI) and so forth. Repeat this process until the video segment is complete.

Example PART 4A: The caregiver demonstrates the child’s target behavior again after receiving the provider’s explicit feedback. HOWEVER, the caregiver responded almost 20 seconds later. Because this did not occur within the 10-second time window, the rater must shift to the column to the right. The rater refers to the code’s key to identify the caregiver’s behavior, uses the abbreviation for ‘caregiver demonstration’ (CDEM) to code in the C2-BI box, and records the time the behavior was observed.

[illegible]

Example PART 4B: The provider did not respond to the caregiver within a 10-second time window, because she was taking notes. The rater must shift to the column to the right and code the next observed behavior in C2-BI. The provider finishes taking notes and begins to observe the caregiver-child interaction. The rater refers to the code's key to identify the provider's behavior, uses the abbreviation for 'observes caregiver-child interaction' (PO) to code in the C2-BI box, and records the time the behavior was observed.

[illegible]

Step 5

Note: If a responsive behavior AND a distraction occurs within 10 seconds, record the responsive behavior, and disregard the distraction.

[illegible][illegible]

APPENDIX F (continued)

ADDITIONAL CODING NOTES

1. Only code adult behaviors identified on the *TIERS-R*.
2. All observed *TIERS-R* behaviors should be coded regardless of whether there is a responsive behavior. This is to check for the frequency with which providers and caregivers are implementing evidence-informed practices.
3. If two separate behaviors occur by the same adult consecutively within 10 seconds, record the consecutive behavior in the same column and continue to code sequential behaviors.
4. If the video clip skips to a new activity/routine, move to the column to the right and begin coding.
5. The 10-second time window begins as soon as the previous adult behavior has concluded. For example, the provider gives general feedback (PGFB) and says, “Great job! – two second pause - - You are doing a great job counting to five!” The 10-second time window begins as soon as the provider has finished giving the child general feedback.
 - a) **Exception** - Provider/Caregiver Observation (PO/CO): Code PO/CO at the beginning of the observation and the other adult’s behavior(s) that occur during that observation.

APPENDIX F (continued)*TIERS-R* Coding Form

Observer: _____

Coding Date: _____

IOA: _____

Routine: _____

Video Segment Date: _____

Legend

Behaviors: BI = initiating behavior; BR = responsive behavior	Adults: P = provider; CG = caregiver
---	--

Coding Abbreviations

INTERACTION TERMS	Provider Codes (P)
Observes caregiver-child interactions	PO
Explains embedded intervention	PEI
Prompts participation	PPCG
Provides caregiver explicit feedback	PEFB
Provides caregiver general feedback	PGFB
Demonstrates strategy	PDEM
Uses expansion with child	PEX
Arranges environment for caregiver and child	PEA
Responds contingently to child	PRC
Uses wait time with child	PWT
Initiates discussion	PID
Asks caregiver self-evaluative questions	PEVQ
Asks caregiver reflective questions	PRQ
Asks caregiver interpretive questions	PIQ
Responds to caregiver questions	PRTQ
Distraction	X
Timing Violation	Shift to column to the right

INTERACTION TERMS	Caregiver Codes (C)
Observes provider	CO
Explains embedded intervention	CEI
Prompts child participation	CPC
Provides child explicit feedback	CEFB
Provides child general feedback	CGFB
Demonstrates strategy	CDEM
Uses expansion with child	CEX
Arranges environment for child	CEA
Responds contingently to child	CRC
Uses wait time with child	CWT
Initiates discussion	CID
Asks provider reflective questions	CRQ
Asks provider interpretive questions	CIQ
Responds to provider questions	CRTQ
Distraction	X
Timing Violation	Shift to column to the right

Coding Table

[illegible]

APPENDIX G
Sample *TIERS-R* Coding Form

Observer: WL Coding Date: 8/29/2020 IOA: _____
Routine: Play Video Segment Date: 2.25.15 (AB)

Legend

Behaviors: BI = initiating behavior; BR = responsive behavior	Adults: P = provider; CG = caregiver
---	--

Coding Abbreviations

INTERACTION TERMS	Provider Codes (P)
Observes caregiver-child interactions	PO
Explains embedded intervention	PEI
Prompts participation	PPCG
Provides caregiver explicit feedback	PEFB
Provides caregiver general feedback	PGFB
Demonstrates strategy	PDEM
Uses expansion with child	PEX
Arranges environment for caregiver and child	PEA
Responds contingently to child	PRC
Uses wait time with child	PWT
Initiates discussion	PID
Asks caregiver self-evaluative questions	PEVQ
Asks caregiver reflective questions	PRQ
Asks caregiver interpretive questions	PIQ
Responds to caregiver questions	PRTQ
Distraction	X
Timing Violation	Shift to column to the right

INTERACTION TERMS	Caregiver Codes (C)
Observes provider	CO
Explains embedded intervention	CEI
Prompts child participation	CPC
Provides child explicit feedback	CEFB
Provides child general feedback	CGFB
Demonstrates strategy	CDEM
Uses expansion with child	CEX
Arranges environment for child	CEA
Responds contingently to child	CRC
Uses wait time with child	CWT
Initiates discussion	CID
Asks provider reflective questions	CRQ
Asks provider interpretive questions	CIQ
Responds to provider questions	CRTQ
Distraction	X
Timing Violation	Shift to column to the right

Coding Table

[illegible]

APPENDIX G (continued)

[illegible]

APPENDIX H**Inter-Rater Agreement Sample: One 10-Minute Video**

Item	First 1/3 of video			Second 1/3 of video			Last 1/3 of video		
	Coder	Ref. Coder	% agmt.	Coder	Ref. Coder	% agmt.	Coder	Ref. Coder	% agmt.
1	8	7	88%	6	5	83%	2	2	100%
2	0	0	100%	0	0	100%	0	0	100%
3	0	0	100%	0	0	100%	0	0	100%
4	2	1	50%	0	0	100%	0	0	100%
5	0	1	0%	0	0	100%	0	0	100%
6	0	0	100%	0	0	100%	0	0	100%
7	0	0	100%	0	0	100%	0	0	100%
8	0	0	100%	0	0	100%	1	1	100%
9	0	0	100%	0	0	100%	0	0	100%
10	0	0	100%	0	0	100%	1	1	100%
11	2	2	100%	3	2	67%	2	3	67%
12	0	0	100%	1	1	100%	0	0	100%
13	1	1	100%	0	0	100%	0	0	100%
14	0	0	100%	0	0	100%	0	0	100%
15	0	0	100%	3	3	100%	2	0	0%
16	0	0	100%	0	0	100%	1	0	0%
17	0	0	100%	0	0	100%	0	0	100%
18	3	3	100%	3	4	75%	0	1	0%
19	0	0	100%	0	0	100%	0	0	100%
20	1	1	100%	0	0	100%	0	0	100%
21	1	2	50%	0	0	100%	0	0	100%
22	0	0	100%	0	0	100%	0	0	100%
23	0	0	100%	0	0	100%	0	0	100%
24	9	11	82%	8	10	80%	2	3	67%
25	0	0	100%	0	2	0%	0	0	100%
26	0	1	0%	3	3	100%	1	1	100%
27	4	3	75%	1	1	100%	1	2	50%
	31	33		28	31		13	14	

Total average for the
video for the three
segments

87%

93%

85%

Average controlled for
number of observations
of each behavior

83%

84%

63%

APPENDIX H (Continued)

Average of all 3 segments	89%
------------------------------	-----

Average controlled for number of observations for each behavior	80%
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APPENDIX I**IRB Approval**

**Approval Notice
Amendment – Expedited Review
UIC Amendment # 11**

April 18, 2019

Christine Salisbury, PhD
Special Education
Phone: [REDACTED]

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

Dear Dr. Salisbury:

Your application was reviewed and approved on April 18, 2019. The amendment to your research may now be implemented.

Please note the following information about your approved amendment:

Amendment Approval Date: April 18, 2019

Amendment:

Summary: UIC Amendment #11 (response to conditions required), dated, and submitted 17 April 2019 and accepted 18 April 2019 is an investigator-initiated amendment regarding the following:

- (1) modifying the student dissertation sub-study to revise the TIERS instrument and procedures to remove the comparative elements of the sub-study; a User Feedback Survey will be used to obtain feedback regarding the revised TIERS-R, in place of the previously proposed interviews and focus groups; graduate student rater subject tasks will be reduced from two days of training to one day, and from coding 10 hours of video recordings to coding five hours of video recordings (Protocol, v6, 4/17/2019); and
- (2) submitting revised consent documents reflecting the above (Expert Panel Consent, v2, 4/12/2019; Rater Consent, v2, 4/12/2019).

Approved Subject Enrollment #:

75

Performance Sites:

UIC, Florida State University

Sponsor:

US Dept of Education/IES

Institutional Proposal (IP) #:

00003052

Grant/Contract No:

R324A130121

Grant/Contract Title:

Embedded Practices and Intervention with Caregivers (EPIC)

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APPENDIX I (continued)

**Research Protocol:**

- a) Embedded Practices and Intervention with Caregivers; Version 6; 04/17/2019

Documents that require an approval stamp or separate signature can be accessed via [OPRS Live](#). The documents will be located in the specific protocol workspace. You must access and use only the approved documents to recruit and enroll subjects into this research project.

Informed Consents:

- a) Rater Consent; Version 2; 04/12/2019
b) Expert Panel Consent; Version 2; 04/12/2019

Please be sure to:

- Use only the IRB-approved and stamped consent documents 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 the [policies](#) of the UIC Human Subjects Protection Program (HSPP) and the guidance [Investigator Responsibilities](#).

Please note that the IRB 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) 996-2014. Please send any correspondence about this protocol to OPRS via [OPRS Live](#).

Sincerely,

Sandra Costello
Assistant Director, IRB # 2
Office for the Protection of Research Subjects

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

APPENDIX I (continued)



University of Illinois at Chicago
Research Information and Consent for Expert Panel Participation in Social, Behavioral, or
Educational Research
“Analysis of Transactional Interactions in Triadic Early Intervention Home Visits”

Principal Investigator/Researcher Name and Title: Kierstin Modellmog, Doctoral candidate
Faculty Advisor Name and Title: Christine Salisbury, PhD, Professor Emerita
Department and Institution: Special Education and University of Illinois at Chicago
Address and Contact Information: 1947 N. Cleveland Ave., Apt. 2F Chicago, IL 60614 and
 (404) 375-4679 or kmodde2@UIC.edu

About this research study

You are being invited to participate in a research study called the “*Analysis of Triadic Transactional Interactions in Early Intervention Home Visits*”. The purpose of this study is to revise an existing measure (the *Triadic Intervention and Evaluation Rating Scale*) (*TIERS*) which is used to evaluate adult interactions during early intervention (EI) home visits. The aim of the study is to update and improve the tool’s content and format and, in the process, make it better able to capture reciprocal adult interactions. The revised *TIERS* (*TIERS-R*) will be evaluated to determine the extent to which the tool captures reciprocal adult behaviors. A small-scale evaluation study will be conducted to establish the feasibility, utility, and perceived relevance of the *TIERS-R* for measuring the nature of and changes in adult interactions over time.

Taking part in this study is voluntary

Your participation in this research study is voluntary. You may choose to say “no” to this research or may choose to stop participating in the research at any time. Deciding not to participate, or deciding to stop participating later, will not result in the loss of any services, class standing, and/or professional status to which you are entitled, and will not affect your relationship with the University of Illinois at Chicago or any of the agencies or organizations collaborating in this research.

This consent form will give you information about the research study to help you decide whether you want to participate. Please read this form and ask any questions you have before agreeing to be in the study.

UIC IRB Social, Behavioral, and Educational

[EPIC TIERS Study – Expert Panel Consent]

Research Informed Consent Template:

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APPENDIX I (continued)

You are being asked to participate in this research study because you have published work in the field of EI and/or assessment development or you are a practicing professional who has a minimum of two years' experience with routines-based intervention and/or coaching caregivers in EI home-based settings

A maximum of 14 adult participants will be enrolled in this research study.

Important Information

This information gives you an overview of the research. More information about these topics may be found in the pages that follow.

WHY IS THIS STUDY BEING DONE?	The purpose of this study is to revise an existing measure, the <i>Triadic Interaction and Evaluation Rating Scale (TIERS)</i> , to better assess reciprocal adult behaviors as they occur during triadic EI home visits.
WHAT WILL I BE ASKED TO DO DURING THE STUDY?	<p><u>ALL EXPERT PANEL MEMBERS:</u> You will receive the revised version of the <i>TIERS (TIERS-R)</i> and its protocol via email or hardcopy and be asked to thoroughly review the scale's items. You will be asked to independently complete several types of forms: 1) demographic form (e.g., age, gender, race, education, experience); 2) <i>content validation form</i> to provide us with evaluative feedback about the clarity and relevancy of the <i>TIERS-R</i> items; 3) <i>format evaluation form</i> to provide us with evaluative feedback about the design, readability, and efficiency of the <i>TIERS-R</i> format; and 4) <i>User Feedback Survey</i> to provide the doctoral student researcher with evaluative feedback about the clarity, utility, and feasibility of the <i>TIERS-R</i>. The <i>User Feedback Survey</i> will also solicit your perceptions regarding the completeness and clarity of the <i>TIERS-R</i> protocol.</p> <p><u>PRACTICING PROFESSIONALS FROM THE EXPERT PANEL:</u> You will additionally be asked to participate in using the <i>TIERS-R</i>. We will ask you to code two 10-minute videotaped segments of home visits using the <i>TIERS-R</i> and its protocol. Following the coding activity, you will be asked to complete the <i>User Feedback Survey</i> to share your perceptions of the utility, acceptability, and feasibility of the content and format of the <i>TIERS-R</i>.</p>

APPENDIX I (continued)

HOW MUCH TIME WILL I SPEND ON THE STUDY?	<p>You will receive the <i>TIERS-R</i> and its protocol in May 2019 and have approximately two weeks to review.</p> <p>You will receive the demographic form, the <i>content validation form</i>, and the <i>format evaluation form</i> in May 2019. You are being asked to complete these three forms within a week and return your completed forms to the doctoral student researcher in person or via email.</p> <p>The <i>TIERS-R</i> rating activity will be offered to practicing professionals on two separate days for your convenience (one weekend day and one-week day evening) in June 2019. You will be asked to bring your own laptops and headphones for coding videotape segments. Rating videotapes will last approximately minutes. Once you have finished rating videotapes, you will be asked to complete the <i>User Feedback Survey</i> online before leaving the activity session.</p>
ARE THERE ANY BENEFITS TO TAKING PART IN THE STUDY?	<p>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.</p>
WHAT ARE THE MAIN RISKS OF THE STUDY?	<p>The activities you will be doing have no more risk of harm than you would experience in everyday life.</p>

APPENDIX I (continued)

DO I HAVE OTHER OPTIONS BESIDES TAKING PART IN THE STUDY?	This research study is not designed to provide other opportunities to participate, and you have the option to decide not to take part at all or withdraw your participation at any time without any consequences.
QUESTIONS ABOUT THE STUDY?	<p>For questions, concerns, or complaints about the study, please contact the doctoral student researcher, Kierstin Modellmog at [REDACTED]</p> <p>To contact the faculty supervisor Christine Salisbury, please e-mail her at [REDACTED]</p> <p>If you have questions about your rights as a study subject; including questions, concerns, complaints, or if you feel you have not been treated according to the description in this form; or to offer input you may call the UIC Office for the Protection of Research Subjects (OPRS) at 312-996-1711 or 1-866-789-6215 (toll-free) or e-mail OPRS at uicirb@uic.edu.</p>

Please review the rest of this document for details about these topics and additional things you should know before making a decision about whether to participate in this research. Please also feel free to ask the researchers questions at any time.

What about privacy and confidentiality?

Efforts will be made to keep all information about you, or provided by you confidential; however, we cannot guarantee absolute confidentiality. During this study, Kierstin and her research team will collect demographic information about you and evaluative feedback for the purposes of this research. We will assign an ID number to your demographic form, *content validation form*, *format evaluation form*, and interview data and will input the data for analysis using only this ID number. No personally identifiable information will be included in study reports. Only my faculty sponsor and I 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 monitors the study or consent process), if required by law, or without your permission. If the results are published or discussed at conferences, no information will be included that will reveal the identity of the participants. However, laws and state university rules might require us to tell certain people about you. For example, study information which identifies you and the consent form signed by you may be looked at and/or copied for quality assurance and data analysis by:

- Representatives of the university committee and office that reviews and approves research studies, the Institutional Review Board (IRB) and Office for the Protection of Research Subjects.
- Other representatives of the State and University responsible for ethical, regulatory, or financial oversight of research.

APPENDIX I (continued)

- Government Regulatory Agencies, such as the Office for Human Research Protections (OHRP).

What are the costs for participating in this research? There are no costs to you for participating in this research.

Will I be reimbursed for any of my expenses or paid for my participation in this research? Practicing professionals will receive a \$25 gift card at the conclusion of the evaluation activity. Parking and travel expenses related to training and interviews will be paid for.

Can I withdraw or be removed from the study?

You can choose whether or not to participate in this study. If you volunteer, you may withdraw at any time without repercussions. You may also refuse to answer questions you don't want to answer and still remain in the study.

If you choose to no longer be in the study and you do not want any of your future information to be used, you must inform the doctoral student researcher, Kierstin Modellmog, in writing at the address on the first page or via email also included on the first page. Kierstin, may still use your information that was collected prior to your written notice.

What if I am a UIC student?

You may choose not to participate or to stop your participation in this research at any time. This will not affect your class standing or grades at UIC. The investigator may also end your participation in the research. If this happens, your class standing or grades will not be affected. You will not be offered or receive any special consideration if you participate in this research.

What if I am a UIC employee?

Your participation in this research is in no way a part of your university duties, and your refusal to participate will not in any way 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.

Remember:

Your participation in this research is voluntary. Your decision whether or not to participate will not affect your current or future relations with the University. If you decide to participate, you are free to withdraw at any time without affecting that relationship.

Signature of Subject

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 this research. I will be given a copy of this signed and dated form.

UIC IRB Social, Behavioral, and Educational

[EPIC TIERS Study – Expert Panel Consent]

Research Informed Consent Template:

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APPENDIX I (continued)

Signature

Date

Printed Name

Signature of Person Obtaining Consent

Date (must be same as subject's)

Printed Name of Person Obtaining Consent

APPENDIX I (continued)



University of Illinois at Chicago
Research Information and Consent for Rater Participation in Social, Behavioral, or
Educational Research
"Analysis of Transactional Interactions in Triadic Early Intervention Home Visits"

Principal Investigator/Researcher Name and Title: Kierstin Modellmog, Doctoral candidate

Faculty Advisor Name and Title: Christine Salisbury, PhD, Professor Emerita

Department and Institution: Special Education and University of Illinois at Chicago

Address and Contact Information: [REDACTED]

Sponsor: None

About this research study

You are being invited to participate in a research study called the "*Analysis of Triadic Transactional Interactions in Early Intervention Home Visits*". The purpose of this study is to revise an existing measure (the *Triadic Intervention and Evaluation Rating Scale*) (*TIERS*) which is used to evaluate adult interactions during early intervention (EI) home visits. The aim of the study is to update and improve the tool's content and format and, in the process, make it better able to capture reciprocal adult interactions. The revised *TIERS* (*TIERS-R*) will be evaluated to determine the extent to which the tool captures reciprocal adult behaviors.. A small-scale evaluation study will be conducted to establish the feasibility, utility, and perceived relevance of the *TIERS-R* for measuring the nature of and changes in adult interactions over time.

Taking part in this study is voluntary

Your participation in this research study is voluntary. You may choose to say "no" to this research or may choose to stop participating in the research at any time. Deciding not to participate, or deciding to stop participating later, will not result in the loss of any services, class standing, and/or professional status to which you are entitled, and will not affect your relationship with the University of Illinois at Chicago or any of the agencies or organizations collaborating in this research.

UIC IRB Social, Behavioral, and Educational

[EPIC TIERS Study - Rater Consent]

Research Informed Consent Template:

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APPENDIX I (continued)

This consent form will give you information about the research study to help you decide whether you want to participate. Please read this form and ask any questions you have before agreeing to be in the study.

You are being asked to participate in this research study because you have a minimum of two years' experience in early intervention (EI) home visits or have graduated from or are currently enrolled in an Illinois graduate or undergraduate education program.

A maximum of 14 adult participants will be enrolled in this research study.

Important Information

This information gives you an overview of the research study. More information about these topics may be found in the pages that follow.

WHY IS THIS STUDY BEING DONE?	The purpose of this study is to revise an existing measure, the <i>Triadic Interaction and Evaluation Rating Scale (TIERS)</i> , to better assess reciprocal adult behaviors as they occur during triadic EI home visits.
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APPENDIX I (continued)

WHAT WILL I BE ASKED TO DO DURING THE STUDY?	<p>You are being asked to participate in a one-day, face-to-face training activity and will receive ongoing support from the doctoral student researcher in person or via phone to ensure that you can accurately score the <i>TIERS-R</i>. Prior to training, you will be asked to thoroughly review the assessment tool and its protocol in preparation for the training process.</p> <p>You are being asked to participate in two training booster sessions via Skype or face-to-face, whichever is more convenient for you.</p> <p>You are being asked to complete two types of measures: 1) a demographic form about you (e.g., age, gender, race, education, experience) and 2) a <i>User Feedback Survey</i> to provide the doctoral student researcher with evaluative feedback about the clarity, utility, and feasibility of the <i>TIERS-R</i>. The <i>user feedback survey</i> will also solicit your perceptions regarding the completeness and clarity of the <i>TIERS-R</i> protocol.</p> <p>You are being asked to code approximately 5 hours (total) of videotaped EI home visits using the <i>TIERS-R</i> assessment tool following the training process. You will be coding the occurrence of adult interaction behaviors as they evolve during early intervention home visits.</p>
HOW MUCH TIME WILL I SPEND ON THE STUDY?	<p>Training will take place in August 2019 and require approximately 3.5 hours in a one-day training session. You are being asked to complete a brief demographic form at the beginning of training which will require approximately 5 minutes and a 10-minute <i>user feedback survey</i> at the end of training.</p>

APPENDIX I (continued)

	<p>You are being asked to participate in a 1-hour booster training session in person or via Skype twice before coding the home visit videotapes begins (approximately September and October 2019). After you complete the booster sessions, you will be asked to complete a 15-minute practice video coding quiz.</p> <p>You are being asked to independently code approximately 5 hours of videotaped home visits using the <i>TIERS-R</i> over a six-week period starting in October 2019.</p>
ARE THERE ANY BENEFITS TO TAKING PART IN THE STUDY?	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.
WHAT ARE THE MAIN RISKS OF THE STUDY?	The activities you will be doing have no more risk of harm than you would experience in everyday life.
DO I HAVE OTHER OPTIONS BESIDES TAKING PART IN THE STUDY?	This research study is not designed to provide other opportunities to participate, and you have the option to decide not to take part at all or withdraw your participation at any time without any consequences.
QUESTIONS ABOUT THE STUDY?	<p>For questions, concerns, or complaints about the study, please contact the doctoral student researcher, Kierstin Modellmog at [REDACTED]</p> <p>To contact the faculty supervisor Christine Salisbury, please e-mail her at [REDACTED]</p> <p>If you have questions about your rights as a study subject; including questions, concerns, complaints, or if you feel you have not been treated according to the description in this form; or to offer input you may call the UIC Office for the Protection of Research Subjects (OPRS) at 312-996-1711 or 1-866-789-6215 (toll-free) or e-mail OPRS at uicirb@uic.edu.</p>

APPENDIX I (continued)

Please review the rest of this document for details about these topics and additional things you should know before making a decision about whether to participate in this research. Please also feel free to ask the researchers questions at any time.

What about privacy and confidentiality?

Efforts will be made to keep all information about you, or provided by you confidential; however, we cannot guarantee absolute confidentiality. During this study, Kierstin and her research team will collect demographic information about you and evaluative feedback for the purposes of this research. We will assign an ID number to your demographic form, *user feedback form*, and interview data and will input the data for analysis using only this ID number. No personally identifiable information will be included in study reports. Only my faculty sponsor and I 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 monitors the study or consent process), if required by law, or without your permission. If the results are published or discussed at conferences, no information will be included that will reveal the identity of the participants. However, laws and state university rules might require us to tell certain people about you. For example, study information which identifies you and the consent form signed by you may be looked at and/or copied for quality assurance and data analysis by:

- Representatives of the university committee and office that reviews and approves research studies, the Institutional Review Board (IRB) and Office for the Protection of Research Subjects.
- Other representatives of the State and University responsible for ethical, regulatory, or financial oversight of research.
- Government Regulatory Agencies, such as the Office for Human Research Protections (OHRP).

What are the costs for participating in this research? There are no costs to you for participating in this research.

Will I be reimbursed for any of my expenses or paid for my participation in this research?

You will be offered a payment of \$100 in the form of a VISA gift card when you complete the study. In addition, with the consent of your advisor and department, you will be offered research hours. If you do not finish the study, you will receive the same number of research hours as you completed during your participation in the study. Parking and travel related expenses for training and interviews will be paid for.

Can I withdraw or be removed from the study?

You can choose whether or not to participate in this study. If you volunteer, you may withdraw at any time without repercussions. You may also refuse to answer questions you don't want to answer and still remain in the study.

If you choose to no longer be in the study and you do not want any of your future information to be used, you must inform the doctoral student researcher, Kierstin Modellmog, in writing at the

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[EPIC TIERS Study - Rater Consent]

Research Informed Consent Template:

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APPENDIX I (continued)

address on the first page or via email also included on the first page. The researcher, Kierstin, may still use your information that was collected prior to your written notice.

What if I am a UIC student?

You may choose not to participate or to stop your participation in this research at any time. This will not affect your class standing or grades at UIC. The investigator may also end your participation in the research. If this happens, your class standing or grades will not be affected. You will not be offered or receive any special consideration if you participate in this research.

What if I am a UIC employee?

Your participation in this research is in no way a part of your university duties, and your refusal to participate will not in any way 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.

Remember:

Your participation in this research is voluntary. Your decision whether or not to participate will not affect your current or future relations with the University. If you decide to participate, you are free to withdraw at any time without affecting that relationship.

Signature of Subject

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 this research. I will be given a copy of this signed and dated form.

Signature

Date

Printed Name

Signature of Person Obtaining Consent

Date (must be same as subject's)

Printed Name of Person Obtaining Consent

VITA

- NAME:** Kierstin Mahala Modellmog
- EDUCATION:** B.A., International Affairs, University of Colorado Boulder, Boulder, Colorado, 2010
M.A., Early Childhood Education (Specialization in Special Education), University of Colorado Denver, Denver, Colorado, 2013
Ph.D., Special Education, University of Illinois at Chicago, Chicago, Illinois, 2013-Present
- TEACHING:** Department of Education, University of Illinois at Chicago, 2015 (Summer and Fall), 2016 (Summer and Fall), and 2018 (Summer)
- RESEARCH:** Research Experience - Embedded Practices and Intervention with Caregivers (EPIC) Project, University of Illinois at Chicago, 2013-2016
- CERTIFICATIONS:** IRB Certification, University of Illinois at Chicago, 2013-Present
Fulfilled requirements for Special Education License, University of Colorado, Denver, 2013
- EDITORIAL**
- REVIEW BOARD:** Editorial Review Board (Kierstin Modellmog); Handbook of Research on Diversity in Special Education. (2016). Editors: Marie Tejero Hughes and Elizabeth Talbott. Publisher: Wiley.
- PUBLICATIONS:** Modellmog, K., Salisbury, C. & Romano, M. (2016, October). *Taking A Closer Look At Why Caregiver Coaching Is So Hard*. Poster presented at the Division for Early Childhood's 32nd Annual International Conference on Young Children with Special Needs and Their Families, Louisville, Kentucky.
- Salisbury, C., Woods, J., Snyder, P., Modellmog, K., Mawdsley, H., Romano, M., Windsor, K. (2017). Caregiver and provider experiences with coaching and embedded intervention. *Topics in Early Childhood Special Education*, 38(1), 17-29.