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Examination of Early Intervention Delivered Via Telepractice with Families of Children Who are Deaf or Hard of Hearing

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EXAMINATION OF EARLY INTERVENTION DELIVERED VIA TELEPRACTICE WITH FAMILIES OF CHILDREN WHO ARE DEAF OR HARD OF HEARING

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ABSTRACT

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The Individuals with Disabilities Education Act (IDEA) assures infants and toddlers with disabilities and their family members receive family-centered early intervention (FCEI). There is an extant body of evidence documenting the use, or lack of use, of FCEI provider behaviors when therapy is delivered in the traditional face-to-face (F2F) condition. This disparity—between best practice and actual practice—is investigated in this study. This study investigated providers' use of FCEI strategies when intervention was delivered to infants and toddlers who were deaf or hard of hearing via telepractice. Telepractice is the use of information and telecommunications technology to provide health services to people who are located at some distance from a provider. The intent of the study was to look at ways in which telepractice might impact providers' implementation of FCEI.

There were two purposes for this exploratory study. The first purpose was to examine the potential relationships between provider attributes (i.e., highest degree, experience delivering FCEI, and experience with telepractice) and the use of FCEI provider behaviors (i.e., observation, direct instruction, parent practice with feedback, and child behavior with provider feedback) by professionals delivering FCEI. Statistical analyses were designed to identify any relationships among provider attributes, any

associations between provider behaviors, and any connections between provider attributes and provider behaviors. The second purpose was to examine the frequency of occurrence of desired FCEI provider behaviors during telepractice sessions and to contrast them to the same behaviors used in F2F therapy.

The main intent of telepractice is to provide access to qualified practitioners for families living in remote or rural areas. Sometimes, however, opportunities for change are incidental. The combination of video-conferencing technology and web-based software supporting synchronous two-way communication has created new opportunities for the delivery of FCEI. Many researchers, program administrators, and FCEI practitioners anticipate that the use of FCEI strategies will be enhanced through telepractice.

Information about participant attributes was collected using a survey tool. The use of FCEI provider behaviors was measured by directly observing and coding digitally-recorded intervention sessions. There were 16 participants in this study working in eight different programs nationwide. Therapy sessions included the provider, the mother, and a child who was deaf or hard of hearing who was 36 months of age or younger. The attributes of providers and the use of four FCEI behaviors were investigated using Fisher's Exact Test. A log-linear count model was applied to the data to assess the effects of provider attributes on provider behaviors. In addition, the data were used to identify the percentage of time FCEI provider behaviors occurred in the telepractice condition and contrast these with the use of these same behaviors in the F2F condition.

There were some significant and marginally significant results demonstrating associations between provider attributes, relationships between provider characteristics

and use of specific provider behaviors, and associations between provider behaviors. While there was a poor goodness of fit between the predicted and observed counts, the use of one provider behavior—parent practice with feedback—was generally the most closely associated with provider attributes. The Poisson distribution gave an expected frequency count for each FCEI provider behavior. This information uncovered relationships between experience and the use of specific FCEI provider behaviors. The results of the study demonstrated that selected FCEI provider behaviors occur in the telepractice condition more frequently than they occur in the F2F condition reported in the literature. Three of the provider behaviors—observation, parent practice with feedback, and child behavior with provider feedback—were used more frequently in the telepractice condition than in F2F therapy. Direct instruction was used in similar amounts in both treatment conditions.

The findings can be applied to a training program for providers using or learning about telepractice. In future studies, it will be of interest to include more participants from more agencies. The information applies to infants and toddlers with all types of disabilities; therefore, future studies might investigate the provider skills of professionals from different disciplines. In future studies, with more participants, more than four provider behaviors documented could be included.

The findings showed there were differences in the use of FCEI provider behaviors when therapy was conducted in telepractice. This increasingly accessible service delivery platform may make therapy more accessible to the parents of infants and toddlers with all types of disabilities. Telepractice is currently funded unevenly throughout the United States. If it can be shown that family-centered early intervention is

conducted as well, if not more robustly, when it is delivered via telepractice, then funding agencies may be more willing to support it.

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ACKNOWLEDGMENTS

I think "it takes a village" to complete a dissertation. I want to formally acknowledge the members of my team. In 2010, I was awarded a fellowship with the National Leadership Consortium on Sensory Disabilities (NLCSD). This fellowship funded my doctoral studies from start to finish. I want to acknowledge the NLCSD, which is a cooperative agreement, H325V090001, funded by the U.S. Department of Education, Office of Special Education Programs.

I want to acknowledge the participants in my study. Directors of programs providing family-centered early intervention around the country were sufficiently interested and intrigued with telepractice to participate in my study. The providers working in those agencies were generous in their willingness to contribute videos. And, 16 parents of young children agreed to share recorded therapy sessions with me—a stranger. I offer my thanks.

My research advisors, Drs. John Luckner and Sandy Bowen, were involved with my studies and my dissertation from start to finish. Dr. Trent Lalonde provided instruction in class and out of class for all statistical issues. I hope he will continue to be a consultant in my professional pursuits; he is a teacher extraordinaire. Dr. Jim Grigsby—a colleague, friend, and committee member—provided unique insights. Our work together is a highlight of my career.

My adult children and my husband all played significant roles. My daughter, Lauren Brown, and I were students together. She graduates with her Master's degree the same month I earn my degree. My husband, Ron Brown, and my son, Ryan Brown, recognized the importance of my pursuit; I value their encouragement.

With the completion of this dissertation study, I conclude a project that was 40 years in the making. Some might think it was a well-orchestrated plan. I see it as a "dream come true."

TABLE OF CONTENTS

LIST OF TABLES

Table

LIST OF FIGURES

Figure

CHAPTER I

INTRODUCTION

The Individuals with Disabilities Education Act (IDEA) (1990, 1997, 2004) assures children with disabilities and their family members receive appropriate intervention. A particular type of service is offered to very young children from the time of diagnosis until the third birthday; these services are addressed in Part C of IDEA and are referred to as family-centered early intervention (FCEI). Children with qualifying disabilities are eligible to receive, indeed, are encouraged to be offered, FCEI.

Family-centered early intervention practices include family members in collaborative decision-making, in goal setting, and in the treatment of their children (Hanft, 1988). Researchers and practitioners include these behaviors in a family-centered early intervention model: (a) a child's parents are actively involved in the intervention; (b) a family's needs and desires determine service delivery; (c) professionals are agents of family members; (d) professionals intervene in ways that maximally promote family members' roles in decision-making; and (e) professionals work to identify and enhance each family member's capabilities and competencies (Brewer, McPherson, Magrab, & Hutchins, 1989; Dunst, 2006; Dunst, Boyd, Trivette, & Hamby, 2002; Dunst, Johanson, Trivette, & Hamby, 1991; McBride, Brotherson, Joanning, Whiddon, & Demmitt, 1993; Powell, 1996; Trivette & Dunst, 2006). A family-centered approach to early intervention requires therapists to have a unique set of knowledge and skills.

It is important to define FCEI in the context of other models of service. There are four models, and these are positioned along a "continuum" (Dunst et al., 2002; Dunst et al., 1991; Espe-Sherwindt, 2008) as shown in Figure 1. On one end of the continuum is a professionally led, or professionally-centered, service. This model is synonymous with a traditional, child-centered model of service delivery wherein the provider focuses on teaching a child new behaviors (Foley, Hochman, & Miller, 1994; Mahoney & Filer, 1996; Mahoney, Spiker, & Boyce, 1996). Next is a family-allied model. This approach makes an attempt to focus on family members who are deemed capable of implementing interventions for their children. The third approach, a family-focused model, extends the role and influence of family members. For instance, family members and professionals collaboratively define a family's needs in addition to the needs of the child with a disability. The model ascribed to in Part C of IDEA (2004) is a family-centered early intervention model. A family-centered approach to early intervention requires the professional to have a unique set of knowledge and skills that is different from the other models. These skills fall into three categories: relational skills, participatory-based strategies, and/or coaching techniques.

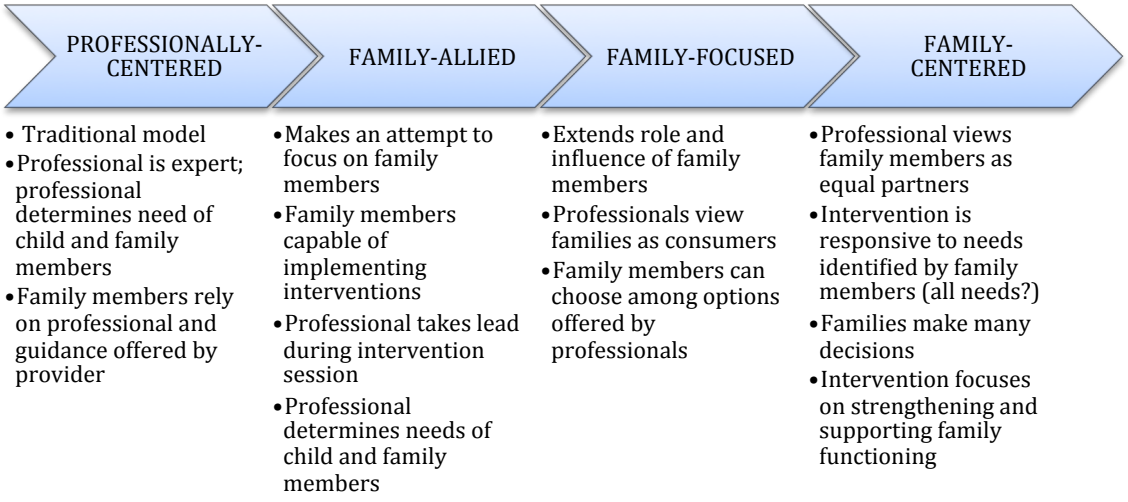

Figure 1. Historical changes in early intervention models (Dunst et al., 1991).

A body of evidence indicates that many children who are supposed to receive FCEI services, according to legislative initiatives (IDEA, 1990, 1997, 2004) and policies (Bricker & Widerstrom, 1996; Chandler et al., 2012; NAEYC, 2009; Sandall, Hemmeter, Smith, & McLean, 2005; Winton & McCollum, 2008), actually do not (Campbell, Chiarello, Wilcox, & Milbourne, 2009; Colyvas, Sawyer, & Campbell, 2010; Crais, Roy, & Free, 2006; Dunst et al., 1991; Fleming, Sawyer, & Campbell, 2011; Sheridan, Edwards, Marvin, & Knoche, 2009). There is an extant body of evidence documenting the use, or lack of use, of FCEI provider behaviors when therapy is delivered in the typical face-to-face (F2F) condition (Campbell & Sawyer, 2007; Dunst & Trivette, 1996; Dunst et al., 2002; Dunst et al., 1991; Hebbeler, Spiker, Morrison, & Mallik, 2008; McBride et al., 1993; Peterson, Luze, Eshbaugh, Jeon, & Kantz, 2007). And, there are several plausible explanations for the under-utilization of FCEI practices.

At least part of the reason rests with the skills and intentions of providers. Some providers think they are conducting FCEI when, in fact, they are not (Dunst et al., 1991; Fleming et al., 2011). Another reason is the dearth of training in FCEI practices given

during pre-service training of early interventionists (Campbell & Coletti, 2013; Campbell et al., 2009; Colyvas et al., 2010; Crais et al., 2006; Fleming et al., 2011; Sheridan et al., 2009).

And yet, use of FCEI strategies has a positive effect on parent and child outcomes (Dunst & Trivette, 2009a; Dunst, Trivette, & Hamby, 2006, 2007, 2008; Judge, 1997; King, King, Rosenbaum, & Goffin, 1999; Thompson et al., 1997). This is the issue motivating my study. Family-centered early intervention practices may be hard to do, but the law requires their use (IDEA, 1990, 1997, 2004), and the benefits have been justified.

I set out to investigate if the use of a different service delivery platform, telepractice, promoted use of FCEI provider behaviors. I studied the use of specific FCEI provider behaviors that were well documented in the literature. I also examined how often these selected provider behaviors occurred across different telepractice sessions that were conducted by different providers. I will now define the basic tenets of telepractice.

Telepractice utilizes telecommunication technologies to deliver health-related services and information to support patient care and is provided from a distance to a client (Dixon, Hook, & McGowan, 2008). Telepractice can connect a client in a remote or rural area with an expert working in a community that is hours from the family's home. The expert, working in a different community, may have requisite knowledge and skills to implement therapeutic strategies that are not available where the child lives. Olsen, Fiechtl, and Rule (2012) described the successful delivery of early intervention services to infants and toddlers with a variety of developmental disabilities. Family-centered early intervention practices occurred more often during telepractice sessions than in traditional F2F visits. The details of this study are presented in Chapter II. For now, I

want to explain the relevance of the findings by Olsen et al. (2012) to my current study. The report that providers used more FCEI behaviors when working in the telepractice condition (Olsen et al., 2012) is encouraging. This finding piqued my interest because I am convinced, and the literature supports this, that the use of FCEI behaviors facilitates better outcomes for children and their parents (Dunst & Trivette, 2009a; Dunst et al., 2006, 2007, 2008; Judge, 1997; King et al., 1999; Thompson et al., 1997).

While promoting the use of FCEI provider behaviors is not the intent of telepractice, per se, I was interested in investigating the potential of telepractice to enhance providers' use of FCEI behaviors. As providers venture into the use of telepractice, they will likely receive training to use the technology associated with interactive video conferencing. The training could include an understanding and utilization of FCEI provider behaviors. Providers will have an opportunity to broaden their knowledge about the use of FCEI practices that they may not be incorporating into sessions conducted in the F2F condition.

The advancement of the use of FCEI strategies using telepractice has been a focus of my clinical work, to date. I chose one disability group for this study. I was interested in the application of FCEI practices with children who are deaf or hard of hearing (DHH). Children who are DHH qualify for Part C services and the associated FCEI services in all states and U.S. territories.

Telepractice is becoming a well-established service delivery platform. Professional organizations have issued statements offering growing support for telepractice. The American Telemedicine Association (ATA) (2012a) recognizes telehealth as the delivery of any health care service or transmission of wellness

information using telecommunications technology. The ATA statements emphasize that telemedicine does not constitute a distinct medical specialty; rather, telemedicine refers to the delivery of medical care via telecommunication-based delivery systems. ATA's Telerehabilitation Special Interest Group (TR-SIG) has multi-disciplinary representation. The TR-SIG focuses on the application of telecommunication technologies to rehabilitation fields (ATA, 2012b). A TR-SIG task force wrote guidelines defining telepractice (Brennan et al., 2010); these guidelines can support practitioners who are starting to use telepractice.

There are many health-allied professional organizations supporting telepractice. The American Counseling Association and the National Association of Social Workers endorse the delivery of psychological services through telepractice (Epstein, 2011). The National Board of Certified Counselors also supports telepractice (Gournaris, 2009). Short of an endorsement, per se, the American Psychological Association mentioned "e-therapy" in the introduction to its code of ethics as one of several therapeutic modalities (Epstein, 2011). The American Occupational Therapy Association (AOTA) recognizes telepractice as an appropriate service delivery model (AOTA, 2010). AOTA has published information for programs to consider when crafting policies related to telepractice (Cason & Brannon, 2011).

Of particular interest to my study is the support for telepractice issued by the American Speech-Language-Hearing Association (ASHA) (2005a, 2005b, 2010). Backing from ASHA is significant because speech-language pathologists (SLP) frequently deliver early intervention services to young children who are DHH (Stredler-

Brown & Arehart, 2000), and these professionals are credentialed by ASHA. ASHA issued a position statement related to telepractice that states:

> Telepractice is an appropriate model of service delivery for the profession of speech-language pathology. Telepractice may be used to overcome barriers of access to services caused by distance, unavailability of specialists and/or subspecialists, and impaired mobility. Telepractice offers the potential to extend clinical services to remote, rural, and underserved populations and to culturally and linguistically diverse populations. (ASHA, 2005a, p. 1)

ASHA documents define telepractice as "the application of telecommunications technology to deliver professional services at a distance by linking clinician to client, or clinician to clinician, for assessment, intervention, and/or consultation" (ASHA, 2005b, para. 1). ASHA has specified standards of practice for telepractice that are consistent with its prevailing code of ethics (ASHA, 2010). While not an endorsement, per se, this ASHA document supports the advancement of telepractice.

Purpose

This was an exploratory study. I had several motives supporting my investigation. Two of my reasons related to the use of FCEI provider strategies: (a) legislation mandates the provision of FCEI strategies (IDEA, 1990, 1997, 2004); and (b) use of FCEI strategies has a positive effect on parent and child outcomes (Dunst & Trivette, 2009a; Dunst et al., 2006, 2007, 2008; Judge, 1997; King et al., 1999; Thompson et al., 1997). I had two other motives driving my interest in telepractice: (a) equitable services are not available for children who are DHH when they live in remote or rural communities; and (b) professional organizations are systematically supporting telepractice. I discuss each of my motives in the following sections.

The participants in my study provided FCEI to infants and toddlers who are DHH and their family members. All participants in my study delivered intervention in the

telepractice condition. Sessions were digitally recorded. These videos were collected, and I analyzed the provider behaviors used in the recorded sessions.

Legislation Mandates Family-centered Early Intervention

The wording in all three iterations and reauthorizations of IDEA (1990, 1997, 2004) embody a philosophical shift from the use of traditional, professionally-centered therapy practices to implementation of FCEI practices. By placing the parents in a primary role, professionals need to consider, learn, and implement strategies appropriate for adult learners—the parents. Family-centered early intervention capitalizes on parents' active participation in their children's daily routines. Family-centered early intervention practices teach parents to utilize specific strategies to enhance child development within these routines—these are called participatory-based strategies. While there are many FCEI provider behaviors, I selected four participatory-based strategies from an extensive list of more than 30 possible behaviors cited in the literature (Basu, Salisbury, & Thorkildsen, 2010; Campbell & Coletti, 2013; Campbell & Sawyer, 2007; Colyvas et al., 2010; Fleming et al., 2011; Friedman, Woods, & Salisbury, 2012; McBride & Peterson, 1997; Peterson et al., 2007; Woods, Wilcox, Friedman, & Murch, 2011). The four behaviors I included were: (a) provider *observes* parent-child interaction (OB); (b) provider offers *direct instruction* to the caregiver (DI); (c) provider offers *feedback* to the parent as the *parent practices* a behavior with the child (PPF); and (d) provider offers *feedback* to the parent about the *child's* actions or about the child's *behavior* (CBF). I considered many issues in making my selection; the four provider behaviors fit these parameters: (a) the behaviors are participatory-based; (b) the behaviors are repeatedly documented in the literature; (c) the behaviors are easily measured; and

(d) my experience corroborates the importance of these behaviors in supporting parent and child outcomes.

Family-centered Early Intervention is Effective

Family-centered early intervention provider behaviors are classified into two categories: (a) relational strategies; and (b) participatory-based activities (Dunst et al., 2002). The relational strategies describe the professional's emotional orientation. Participatory strategies are action oriented and include: (a) the sharing of information; and (b) helping family members learn new skills to use with their children (Campbell, 2004; Campbell & Sawyer, 2007; Dunst & Trivette, 1996; Hanft, Rush, & Shelden, 2004; Klass, 2003; Mahoney et al., 1999; Muma, 1998; Wasik & Bryant, 2001).

The use of FCEI provider behaviors has led to improved parent and family functioning (Judge, 1997; King et al., 1999; Thompson et al., 1997). Participatory-based behaviors, in particular, promote active participation by family members in a treatment session (Dunst et al., 2002). Active parent participation in the child's regular routines outside of the treatment session, in turn, can augment child and parent outcomes (Basu et al., 2010; Dunst et al., 2006, 2007, 2008; Dunst & Trivette, 2009a, 2009b; Moore, Barton, & Chironis, in press; Trivette, Dunst, Hamby, & O'Herin, 2009; Trivette, Dunst, Hamby, & O'Herin, 2010). Based on this evidence, it is appropriate for providers to use FCEI provider behaviors. And yet, the evidence shows that this is not happening the majority of time (Campbell & Sawyer, 2007; Dunst & Trivette, 1996; Dunst et al., 2002; Dunst et al., 1991; Hebbeler et al., 2008; McBride et al., 1993; Peterson et al., 2007), even when the early intervention program administrators report otherwise (Dunst et al., 1991; Dunst

& Trivette, 1996). It is possible that telepractice can facilitate use of FCEI provider behaviors.

Telepractice Delivers Equitable Services to All Children

Roush (2011) stated that one barrier to the delivery of appropriate early intervention services is the lack of qualified practitioners. Roush (2011) also reported that limited access to all communication approaches in a family's community presents another barrier for children who are DHH. I will describe two issues particular to children who are DHH in this context. One issue is when the provider in a community does not have the expertise to work with children who are DHH. This is commonplace in remote and rural communities. Providers may not acquire expertise because they have not received specialized training to work with this population, and/or they are rarely asked to provide services to a family who has a child who is DHH. The second issue relates to a provider's familiarity and facility with different communication approaches. Many professionals have the knowledge and skills to deliver only one communication approach (i.e., sign language or spoken language) (Stredler-Brown, 2008, 2009, 2010). The approach chosen by the family may not match the method the provider knows.

Either one of the issues stated by Roush (2011) can compromise a provider's effectiveness with any given family. Telepractice has the potential to mitigate this problem. A child living in a remote or rural community can receive services from a provider, with the requisite knowledge and skills, living at some distance from the family. A provider in a different community, perhaps hours away, can deliver the intervention using the communication approach the family chooses.

Telepractice is Supported

Of particular interest to my study is the fact that telepractice is currently available to families with infants and toddlers who are DHH (Blaiser, Edwards, Behl, & Munoz, 2012; Broekelmann, 2012; Davis, Phil, Hopkins, & Abrahams, 2012; Hamren & Quigley, 2012; Hopkins, Keefe, & Bruno, 2012; McCarthy, 2012; Peters-Lalios, 2012; Richardson, 2012; Simmons, 2012; Stith, Stredler-Brown, Greenway, & Kahn, 2012). This is the population I studied.

Programmatic support for telepractice. Some programs in the United States, most typically private and not-for-profit agencies, initiated telepractice in response to requests from families to obtain therapy from a certified Listening and Spoken Language Specialist (LSLS) when the specialist worked too far from the families' homes for regular F2F sessions (Blaiser et al., 2012; Broekelmann, 2012; Hamren & Quigley, 2012, Peters-Lalios, 2012). In Maine, the adoption of telepractice was in response to needs of children in rural areas and the need for more consistent intervention in spite of adverse winter travel conditions (Hopkins et al., 2012). In British Columbia, one program offers services via telepractice to meet the needs of families and children who are DHH during the transition to kindergarten (Simmons, 2012). In Australia, two programs offer services to children who are DHH via telepractice (Davis et al., 2012; McCarthy, 2012). In Australia, telepractice provides families with consistent contact with specialists without the need to travel long distances (Davis et al., 2012; McCarthy, 2012). The program administrators from these programs reported on the value of telepractice (Blaiser et al., 2012; Broekelmann, 2012; Davis et al., 2012; McCarthy, 2012; Peters-Lalios, 2012; Richardson, 2012; Stith et al., 2012), the cost benefit (Davis et al., 2012), and/or provider

and parent satisfaction (Blaiser et al., 2012; Broekelmann, 2012; Davis et al., 2012; Peters-Lalios, 2012; Simmons, 2012; Stith et al., 2012).

Research supports telepractice. Practitioners and parents of children who are DHH acknowledged the value of services delivered through telepractice (Blaiser et al., 2012; Broekelmann, 2012; Davis et al., 2012; McCarthy, 2012; Peters-Lalios, 2012; Richardson, 2012; Stith et al, 2012). Telepractice has been associated with positive child outcomes for children who are DHH (Houston, 2011). For example, Houston (2011) reported that children obtained language scores consistent with or exceeding developmental norms, and parents became more confident facilitators of their children's language.

More research was needed, however, to investigate the efficacy and effectiveness of telepractice before it can become accepted as an evidence-based practice. The outcomes of my study may have made a contribution to this body of evidence. The reason relates to the responsibilities of the Part C system in each state. Part C agencies are accountable for the implementation of FCEI practices. If telepractice helps meet this intent of the law, perhaps Part C agency personnel will look more favorably on adopting and funding telepractice sessions.

Research Questions

Three research questions guided my study.

Q1 Is there a relationship between provider attributes (IV) and FCEI provider behaviors (DV)?

Q2 What is the nature of any statistically significant relationship between provider attributes and FCEI provider behaviors?

Q3 How often do the FCEI provider behaviors occur in the telepractice condition in contrast to the frequency of each behavior as it occurs in the F2F condition reported in the literature?

Conceptual Model

Considering providers as the unit of analysis, the first two questions investigated the attributes of providers and their use of FCEI behaviors. I investigated the impact of provider attributes, as an independent variable (IV), on use of four specific FCEI provider behaviors in order to discover any possible relationships. Relationships can be explored and applied to systems of care, to provider training, and to impact and enhance family members' engagement in early intervention. For instance, the attributes of providers using more FCEI behaviors may direct hiring practices; agency personnel can be informed about the attributes of providers that tend to use FCEI behaviors. The information may also be used to impact training in pre-service training programs; the disciplines that produce more providers using FCEI behaviors may have curricula to share. And, significant findings may also influence professional development activities; if less experience leads to use of more FCEI practices, the providers using the FCEI strategies may become mentors for their colleagues.

The independent variables describing provider attributes were: (a) the education level of the providers; (b) certification as a LSLS Auditory-Verbal Therapists (AVT) or Auditory-Verbal Educators (AVEd); (c) the pre-service training discipline of the providers; (d) the amount of time, in number of years, each provider has worked in early intervention; (e) the number of children, birth to 36 months, seen by the provider during his or her career; (f) the number of sessions conducted with children *of any age* using telepractice; and (g) the number of sessions conducted with infants and toddlers, *birth to*

36 months, employing telepractice. Family-centered early intervention provider behaviors were the dependent variables (DV). The four selected FCEI provider behaviors for this study were: (a) observation (OB); (b) direct instruction (DI); (c) parent practice with feedback (PPF); and (d) child behavior with provider feedback (CBF). A detailed description of the selection process I used to identify IVs and DVs is in Chapter III, along with definitions of the selected provider behaviors.

The first two research questions were explored quantitatively. The third research question, describing the frequency of use of the four selected provider behaviors, was examined qualitatively; I inspected the results of my study and the frequency of occurrence of these same behaviors that were documented in the literature. Using this procedure, I could not determine significance. But, I was able to offer descriptive data about the use of FCEI practices in the two conditions (i.e., telepractice and F2F).

Study Hypotheses

I had two purposes for my study. The first purpose was to study the potential relationships between provider attributes and the use of FCEI provider behaviors by these professionals. The analyses provided information showing some relationships among independent variables (IVs) (i.e., certification, experience with FCEI, and telepractice), relationships among dependent variables (DVs) (i.e., OB, DI, PPF, and CBF), and any relationships between dependent and independent variables. When there was a relationship, the strength of the relationship was gauged. It was deemed possible that more education and/or the type of pre-service instruction would impact the use of FCEI provider behaviors. It was also plausible that more years of experience as a FCEI

provider, or a provider who worked with more infants and toddlers, would increase the use of FCEI provider behaviors.

The hypotheses for Research Questions 1 and 2 were:

H1 Provider attributes and provider behaviors are related in the population.

H2 There are associations among provider attributes and provider behaviors in the population.

The second purpose examined the frequency with which specific FCEI provider behaviors were used in telepractice in contrast to the use of the same behaviors in F2F therapy. I collected and examined information about use of four provider behaviors in the telepractice condition: (a) observation (OB); (b) direct instruction (DI); (c) parent practice with feedback (PPF); and (d) child behavior with provider feedback (CBF). A review of the literature provided access to studies that systematically examined providers' use of the same behaviors in the F2F condition (Campbell & Coletti, 2013; Campbell & Sawyer, 2007; Fleming et al., 2011; McBride & Peterson, 1997; Peterson et al., 2007; Ridgley & Snyder, 2010). I described the frequency with which these behaviors were used in telepractice in my study, and I described the frequency with which these behaviors were used in the F2F condition in published research. Any differences in the frequencies in the two different conditions (i.e., F2F and telepractice) will be discussed.

The hypothesis for the third research question was:

H3 Family-centered early intervention (FCEI) provider behaviors occur more frequently in the telepractice condition.

I expected providers to use more FCEI behaviors when therapy was conducted in the telepractice condition. There were several reasons. It is difficult for the provider to work directly with the infant or toddler; a very young child does not seem to engage well or

consistently remotely. But, the provider can easily observe the child and discuss the child's behaviors with the parent. The parent is with the child; the two adults—provider and parent—can easily communicate about the parent's needs and the child's behaviors.

Rationale

It is interesting to note that in spite of legal underpinnings (IDEA, 1990, 1997, 2004), policy documents (Chandler et al., 2012; Bricker & Widerstrom, 1996; NAEYC, 2009; Sandall et al., 2005; Winton & McCollum, 2008) and clinician support for the use of FCEI provider behaviors (Brewer et al., 1989; Dunst, 1999, 2006; Dunst et al., 2002; Dunst et al., 1991; Mahoney et al., 1999; McBride et al., 1993; Powell, 1996; Rush, Shelden, & Hanft, 2003; Trivette & Dunst, 2006; Turnbull et al., 2007; Zaidman-Zait, 2007), uptake has been difficult. Evidence has been provided that FCEI sessions tend to be predominantly professionally-centered and do not support interactions between parent and child (Campbell & Sawyer, 2007; Hebbeler et al., 2008; Peterson et al., 2007).

There are some plausible reasons for providers' underutilization of FCEI behaviors. First, professionals may not receive sufficient instruction or practical experience using FCEI provider behaviors during pre-service training (Campbell et al., 2009; Colyvas et al, 2010; Crais et al., 2006; Fleming et al., 2011; Sheridan et al., 2009). The same issue applies to professional development offered after providers complete their pre-service training (Salisbury, Woods, & Copeland, 2010). Professional development activities, also known as in-service training, are left to the discretion of program directors and are not systematic (Close, Lenihan, McGinis, Stein, & Tyszkiewicz, 2012; S. Lenihan, personal communication, December 18, 2012; Salisbury et al., 2010). Powell (1996) punctuated this point stating:

> Learning the skills to become a family-centered practitioner can be confusing for both neophytes and seasoned practitioners. First, one must "unlearn" traditional therapeutic techniques and then one must prescriptively move from directive, hierarchical and expert driven techniques toward coaching relationships. (p. 446)

Another obstacle is family choice. Some family members choose a traditional, professionally-centered approach (Salisbury et al., 2010). Irrespective of the cause of the problem, it is important to seek solutions. I expected telepractice to be one of those solutions.

While the primary intent of telepractice is to provide families living in remote or rural areas with access to qualified practitioners, sometimes opportunities for change occur incidentally. The combination of video conferencing technology and web-based software supporting synchronous two-way communication has created new opportunities for the delivery of FCEI (Houston & Stredler-Brown, 2012). Many researchers, program administrators, and FCEI practitioners anticipate that the use of FCEI practices (i.e., relational practices, participatory-based strategies, and coaching behaviors) will be enhanced through telepractice (Blaiser et al., 2012; Broekelmann, 2012; Davis et al., 2012; Hamren & Quigley, 2012; Hopkins et al., 2012; Houston & Behl, 2012; McCarthy, 2012; Olsen et al., 2012; Peters-Lalios, 2012). Telepractice, by its very nature, promotes active parental involvement in an early intervention session. Parents participate actively, albeit remotely, with the provider. In telepractice, parents must take on full responsibility for the hands-on work with their children since the provider is unable to touch the infant or toddler.

There are several potential reasons that were intriguing to me and, consequently, provided the motivation for my study. Telepractice can readily engage adults—parents and providers—in dynamic interactions. I suspected the adults to be more likely to

sustain their interaction because the provider cannot expect to establish or maintain an ongoing, direct interaction with the child. This focused interaction between provider and parent can influence providers' use of FCEI behaviors. Family-centered early intervention is designed to support family members and child outcomes. During the sustained provider-parent interaction, the adults can engage in conversations focused on: (a) information; (b) priorities; (c) events that have transpired since the last session; (d) strategies to facilitate the child's development (i.e., communication, language, and play); (e) evaluation; and (f) goals for future sessions (Stredler-Brown, Moeller, Gallegos, Corwin, & Pittman, 2004).

I investigated the attributes of providers and their use of FCEI behaviors. I looked for any relationships among these variables and the strength of the association when there was one. I examined how often the four selected provider behaviors (OB, DI, PPF, CBF) existed across the digitally-recorded telepractice sessions. I reviewed the data to discern if the use of one or more of the behaviors correlated with more use of other behaviors. I also looked at frequency counts of the occurrence of these behaviors in the literature, all conducted in the F2F condition, and explored if the frequencies were more robust in the telepractice condition.

The results of my study could have some practical implications. The results could influence: (a) the instructional content in pre-service training programs; (b) the topics introduced in in-service professional development trainings; (c) hiring practices in early intervention programs; and (d) supervision of early intervention providers.

Very little empirical research has been conducted, to date, of the effectiveness of using telepractice with infants and toddlers who are DHH. There are reports of

satisfaction (Blaiser et al., 2012; Broekelmann, 2012; Davis et al., 2012; Hamren & Quigley, 2012; Hopkins et al., 2012; Houston & Behl, 2012; McCarthy, 2012; Peters-Lalios, 2012). And, there are testimonials attesting to increased use of FCEI provider behaviors (Blaiser et al., 2012; Broekelmann, 2012; Davis et al., 2012; Hamren & Quigley, 2012; Hopkins et al., 2012; Houston & Behl, 2012; McCarthy, 2012; Peters-Lalios, 2012); the same behaviors I studied experimentally.

The outcomes of my study may contribute to the body of evidence supporting the use of FCEI provider behaviors when services are provided via telepractice. Should providers use more FCEI behaviors when conducting sessions through telepractice, then one primary objective of early intervention for infants and toddlers with disabilities may be realized. Perhaps the statement made by McBride et al. (1993), written 20 years ago, holds true today. They stated:

> Resolving the incongruence between family-centered attitudes and actual practice . . . may be a necessary step in the process of change. Until professionals attain the skills necessary to feel competent in expanding their expertise beyond the needs of the child, programming may remain at the current level. (p. 426)

Telepractice may provide the medium for implementing FCEI provider behaviors in the not-too-distant future.

If the telepractice service delivery platform increases the use of FCEI provider behaviors, use of telepractice may garner more interest as an alternative service delivery system. If the telepractice service delivery platform increases the use of FCEI provider behaviors, the findings may add momentum to the emerging acceptance of telepractice, and more programs may opt to offer services via telepractice. Professional organizations may acquire the information that is needed to support a professional stance on

telepractice use. And, state and/or federal agencies may move forward on the establishment of policies defining the use of and reimbursement for telepractice in the 21st Century.

Delimitations

My interest in this research topic was a result of the observations I have made. For instance, I have witnessed parents with children who are DHH struggling to make decisions. One very important decision is the selection of a communication approach. I hold that it is critical for parents to have access to the communication approach they prefer (Stredler-Brown, 2009, 2010). As the director of an early intervention program for almost 20 years, I saw, and tried to ameliorate, parents' concerns when they could not find a professional in the community to use the selected communication approach. Telepractice is one way to provide the preferred communication approach. Telepractice can engage a provider who is working at a distance to instruct family members using the communication approach selected for the child. For instance, a family may elect to communicate with the child using American Sign Language (ASL). It is possible that a professional fluent in ASL may not live within a reasonable driving distance of the family. Telepractice could connect the family, on a regular basis, with a FCEI provider who is fluent in ASL. The same example can apply to a family's decision to use Auditory-Verbal practice. Indeed, several program administrators were motivated to invest in telepractice based on parents' requests for remote access to LSLS certified AVTs or AVEds (Blaiser et al., 2012; Broekelmann, 2012; Hamren & Quigley, 2012, Peters-Lalios, 2012).

Another issue of interest relates to my experience facilitating the use of FCEI provider behaviors. In my position as director of a statewide early intervention program, I noticed that providers frequently used professionally-centered and family-focused approaches. This was in spite of the program's directive to use FCEI provider behaviors and testimony from many providers acknowledging they were. Materials were developed and delivered during professional development activities. But, little change resulted. Alternatively, the use of FCEI provider behaviors has been reported to be robust when professionals use telepractice (A. Peters-Lalios, personal communication, January 26, 2011; B. Hecht, personal communication, September 29, 2012; K. Hamren, personal communication, January 26, 2011; K. T. Houston, personal communication, January 26, 2011; N. Thompson, personal communication, April 9, 2013). To date, the endorsements by professionals serving infants and toddlers who are DHH via telepractice are anecdotal. Empirical studies of the use of FCEI provider behaviors using telepractice have not been done. My study may be unprecedented.

Objectives

I investigated the use of FCEI provider behaviors when therapy was delivered to children who are DHH and no older than 36 months of age. Providers, who were the unit of analysis in my study, delivered intervention in the telepractice condition. I had three objectives: (a) to investigate the impact of provider attributes, as an independent variable (IV) on use of FCEI provider behaviors as the dependent variable (DV); (b) to investigate associations among provider attributes and FCEI provider behaviors; and (c) to describe any contrasts between the use of FCEI provider behaviors in the F2F and telepractice conditions.

Theoretical Framework

Providers were the unit of analysis in my study. I was interested in the demographic characteristics of the providers and the FCEI behaviors the providers used. I will describe the selection of these variables.

Provider Attributes

The attributes of providers delivering FCEI in the F2F condition have been studied and reported in the literature (Campbell & Sawyer, 2007; Fleming et al., 2011; Peterson et al., 2007). I selected four provider attributes from the variables in other studies: (a) education level of providers; (b) pre-service training discipline; (c) number of years working in early intervention; and (d) number of children served. The four independent variables of interest that were explored and documented in my study fell into two categories: (a) the pre-service training of providers; and (b) the professional experience of providers. These four attributes were selected based on the influence these attributes had on the use of FCEI provider behaviors in published studies (Campbell & Sawyer, 2007; Fleming et al., 2011; Peterson et al., 2007).

Pre-service training. Providers working with infants and toddlers who are DHH are a hybrid group. These professionals come from a variety of pre-service training programs. A survey of FCEI providers working with infants and toddlers who were DHH in 16 states (Arehart, Yoshinaga-Itano, Thomson, Gabbard, & Stredler-Brown, 1998; Stredler-Brown & Arehart, 2000) reported that the majority of professionals received pre-service training in three types of programs: (a) teacher of students who are deaf/hard of hearing; (b) speech/language pathology; and (c) audiology. A small number of providers received pre-service training in early childhood education or early childhood

special education. A graduate degree in any one of these training programs does not guarantee the professional learned or acquired the competencies needed to use FCEI provider behaviors (Stredler-Brown, 2010). Knowing the pre-service training discipline of my study's participants provided insights into training disciplines that more adequately prepare professionals to use FCEI provider behaviors.

Professional experience. Learning is more robust when learners have opportunities to apply information (Joyce & Showers, 2002). While learners retain only 20% of the information presented in a lecture format, individuals provided with abundant opportunities to practice retain 95% of the information (Joyce & Showers, 2002). Based on this premise, it is possible that providers with more experience will exhibit use of different behaviors and/or varying frequencies of these behaviors. I collected information identifying the number of years each participant worked in early intervention. I also collected information identifying the number of children each participant had enrolled on his or her caseload. This caseload reflected all children served since the participant graduated from his or her pre-service training program.

Provider Behaviors

I also studied the FCEI provider behaviors. A FCEI model includes relational and participatory strategies (Dunst et al., 2002). Relational strategies describe the professional's emotional orientation (Dunst & Trivette, 1996; Hanft et al., 2004; Jones, 1993). Participatory strategies differ from relational strategies. Participatory strategies are action oriented and include: (a) the sharing of information; (b) helping family members learn new skills to use with their children (Campbell, 2004; Campbell & Sawyer, 2007; Dunst & Trivette, 1996; Hanft et al., 2004; Klass, 2003; Mahoney et al.,

1999; Muma, 1998; Wasik & Bryant, 2001); and (c) coaching strategies (Peterson et al., 2007; Rush et al., 2003; Salisbury et al., 2010).

I collected information on the frequency of occurrence of four specific FCEI behaviors used by the participants in my study. I carefully selected four provider behaviors from a much more extensive list. I purposefully chose only participatory-based strategies. These strategies were easily documented. They also occurred more frequently than relational strategies (B. Sawyer, personal communication, October 2, 2013). The provider behaviors I chose were: (a) observation (OB); (b) direct instruction (DI); (c) parent practice with provider feedback (PPF); and (d) child behavior with provider feedback (CBF). I considered various issues as I selected these four behaviors. I chose behaviors that were: (a) participatory-based; (b) measurable; and (c) repeatedly documented in the literature (Campbell & Sawyer, 2007; Colyvas et al., 2010; Fleming et al., 2011; Powell, 1996; Salisbury et al., 2010; Woods et al., 2011). I chose only four behaviors in order to accommodate the statistical analyses that could be used with the number of participants I expected to enroll in my study.

Variables of Interest

Based on the aforementioned criteria, I selected four provider attributes and four provider behaviors. A brief description is offered below. A more detailed description can be found in Chapter III.

Provider Attributes

I was interested in the demographic characteristics of the providers in my study. I selected seven independent variables describing provider attributes. These were: (a) the education level of the providers; (b) certification as a LSLS AVT or AVEd; (c) the

pre-service training discipline of the providers; (d) the amount of time, in number of years, each provider has worked in early intervention; (e) the number of children, birth to 36 months, seen by the provider during his or her career; (f) the number of sessions conducted with children *of any age* using telepractice; and (g) the number of sessions conducted with infants and toddlers, *birth to 36 months*, employing telepractice.

Education level. I accounted for FCEI providers having associate degrees, bachelor's degrees, master's degrees, and/or doctoral degrees. This variable was of interest because the amount of pre-service education may offer providers more opportunities to acquire information about FCEI practices. I also asked participants to identify any certificates they earned. The training associated with a certificate can contribute to a provider's body of knowledge.

Pre-service training discipline. There is a difference in the amount of instruction offered by different pre-service training disciplines (i.e., teacher of the DHH, SLP, and audiology) (Stredler-Brown, 2009). Knowing the pre-service training discipline of my study's participants could provide insights into training disciplines that more adequately prepare professionals to use FCEI provider behaviors.

Years working in early intervention. I was interested in studying the amount of experience, measured in number of years, of the participants in my study. I have made clinical observations about the associations among years of experience and use of different behaviors. Ridgley and Snyder (2010) studied this characteristic and found a statistically significant relationship between years delivering early intervention and the use of FCEI provider behaviors. I documented associations between number of years of experience and use of FCEI provider behaviors.

Number of children enrolled in early intervention. I collected information from each participant identifying the total number of children each participant has had on her caseload. The starting point was graduation from the participant's first discipline-related pre-service training program.

Experience using telepractice. I collected information about the providers' experience using telepractice, in general, and specifically with infants and toddlers between birth and 36 months of age. I documented associations between these variables and providers' use of FCEI behaviors.

Family-centered Early Intervention Provider Behaviors

I collected information on the frequency of occurrence of specific FCEI behaviors used by the participants in my study. I carefully selected four provider behaviors from an extensive list of more than 30 possible behaviors (Campbell & Sawyer, 2007; Colyvas et al., 2010; Fleming et al., 2011; Powell, 1996; Salisbury et al., 2010; Woods et al., 2011). These four behaviors were: (a) provider observes parent-child interaction (OB); (b) provider offers the parent direct instruction describing implementation of a technique or strategy to be used with the child (DI); (c) provider offers feedback to the parent about the parent's interaction with their child (PPF); and (d) provider shares feedback with the parent about the child's behaviors (CBF).

I considered many issues in making this selection. I chose provider behaviors that fit these parameters: (a) participatory-based behaviors; (b) behaviors that were repeatedly documented in the literature; and (c) the number of participants I expected to include in my study. Each behavior was easily measured through observation of digitally-recorded

videos. A detailed description of my justification for selecting each of these FCEI provider behaviors is in Chapter III.

Paradigm

There is a body of evidence documenting providers' underutilization of requisite FCEI behaviors in the F2F condition (Campbell & Sawyer, 2007; Dunst & Trivette, 1996; Dunst et al., 2002; Dunst et al., 1991; Hebbeler et al., 2008; McBride et al., 1993; Peterson et al., 2007). I studied the use of FCEI provider behaviors in the telepractice condition. I accomplished this by collecting and analyzing videos of FCEI delivered via telepractice. As I viewed the videos, I documented each of the four provider behaviors I selected. This measurement was conducted at 30-second intervals.

Methodology

The first two research questions were answered quantitatively. I collected data about participant attributes using a survey tool. I collected data about the use of FCEI provider behaviors by directly observing digitally-recorded intervention sessions. The third research question was addressed through exploratory observations of the frequency with which the four selected provider behaviors were used in the telepractice condition and in F2F therapy.

Participants

Participants were providers delivering FCEI. All children were DHH. I contacted administrators and/or program directors in agencies that were providing FCEI via telepractice to the population of children I targeted. Providers in my study had varied experiences; this information was included as independent variables (IVs) in the study.

Participant boundaries. Beyond the parameters indicated above, there were few limitations placed on provider qualifications in my study. I intended to accept providers working with not-for-profit agencies, in public organizations, and in private practice. In fact, I encouraged this diversity. The place of employment was not an explicit variable in my study.

The majority of programs providing FCEI via telepractice, that were known to me, used primarily Auditory-Verbal practice (Blaiser et al., 2012; Broekelmann, 2012; Hamren & Quigley, 2012; Peters-Lalios, 2012). Consequently, some providers were Listening and Spoken Language Specialist Certified Auditory-Verbal Therapists (LSLS Cert. AVT™) or Listening and Spoken Language Specialist Certified Auditory-Verbal Educators (LSLS Cert. AVEd™) (AG Bell, 2013). This certification became an IV in my study. One of the core competencies of these certified providers is parent guidance, education, and support (AG Bell, 2013). LSLS Cert. AVT and LSLS Cert. AVEd providers have received training in the use of FCEI provider behaviors during the certification process. Although they received this training, it was conjectured that not all of these providers would exhibit FCEI behaviors equally well (K. T. Houston, personal communication, October 25, 2013). The findings are described in Chapter IV.

Participant recruitment. I recruited providers from agencies that provided AVT and from other agencies that did not ascribe solely to this communication approach. In this way, I expected to have participants with more varied pre-service training. This was important in order to obtain a diverse group of providers. I purposively extended invitations to participate to centers all over the United States. The only restrictions I

imposed were for intervention to be delivered using telepractice and that all providers ascribed to the delivery of FCEI.

Digitally-recorded Intervention Sessions

Participants and the agencies in which they worked agreed to share digital recordings of FCEI sessions conducted via telepractice. I planned to accept recorded telepractice sessions that were previously stored. I also planned to accept recorded sessions that were conducted after my initial contact with agency personnel. Administrators, program directors, and participants were told that I was studying provider behaviors in the context of telepractice. I did not share my specific intent to study the use of FCEI provider behaviors, less this information bias the providers' use of FCEI practices.

I hoped to recruit at least one provider from each participating agency. I would accept video recordings from any and all providers within an agency. Providers were the unit of analysis in my study, and I hoped to have at least 10 and up to 20 or more. Each provider contributed one digitally-recorded FCEI session with one client to my database.

I analyzed each digitally-recorded session according to a form I prepared based on the work done by Colyvas et al. (2010). Analyses were not conducted in real time.

Statistical Analyses

I created contingency tables to present the frequency of occurrence of provider attributes and provider behaviors (Jaccard & Becker, 2002). I considered using Chi-square Tests of Independence to analyze the relationship between any two of the provider attributes, any two provider behaviors, and one IV and one DV (Jaccard & Becker, 2002). However, Fisher's Exact Test was used as an alternative to the Chi-squared Tests of

Independence to investigate the relationship among different variables. This decision was based on my small sample size. I also used a log-linear count model to assess the effects of provider attributes on provider behaviors. Log-linear models are used to model the association or interaction among categorical variables (Jaccard & Becker, 2002).

Contingency tables. I created contingency tables for each combination of IVs, DVs, and pairs of IVs and DVs. The two-way contingency tables had rows and columns of finite categorical variables. I obtained observed frequencies in each cell. The tables prepared the data so that I could look at the association among all dependent variables and independent variables (Howell, 2004; Jaccard & Becker, 2002).

Fisher's Exact Test. Fisher's Exact Test was used to uncover any relationships between any two variables. Frequency counts on the same individuals were used to run this statistic (Jaccard & Becker, 2002).

The null hypothesis for the first research question stated that provider attributes and provider behaviors were unrelated in the population. The alternative hypothesis stated that provider attributes and provider behaviors were related in the population. I derived a set of expected frequencies based on the assumption that the null hypothesis was true and there was no relationship between the two sets of variables. Then, I compared the expected frequencies to the observed frequencies (Jaccard & Becker, 2002).

General linear model (GLM). Because I had complicated contingency tables involving several variables, the GLM was used to conduct additional analyses. The GLM allowed me to investigate the potential for all of the variables, response and explanatory, to have relationships. The strength of the relationships were determined when there was one.

The third research question was an examination of the four identified provider behaviors used in both the telepractice and F2F conditions. I carefully reviewed how often these behaviors were used in telepractice, how often they were used in the F2F condition as stated in the literature, and any differences in use between the two conditions.

Limitations

The first purpose of my study was to investigate any potential relationships between provider attributes, provider behaviors, and pairs of attributes and behaviors. By reviewing digitally-recorded sessions, I identified the frequency with which providers used four identified FCEI behaviors when working in the telepractice condition with infants and toddlers who were DHH.

There is an existing body of evidence documenting the use, or lack of use, of FCEI provider behaviors when therapy is delivered in the F2F condition (Campbell & Sawyer, 2007; Colyvas et al., 2010; Fleming et al., 2011; Powell, 1996; Salisbury et al., 2010; Woods et al., 2011). The second purpose of my study was to examine the frequency with which FCEI provider behaviors were used in telepractice and to discuss the percentages in the context of the same behaviors used in F2F therapy. I expected to see FCEI provider behaviors used more frequently in the telepractice condition. I was not disappointed.

That said, there are several limitations imposed on this study from the start: (a) there were some commonly reported provider attributes that were not included in my study; (b) there were many FCEI provider behaviors that were not included in this study; (c) only providers working with children who were DHH were included in my study; and

(d) this was not a comparative effectiveness study to determine the benefits and harms of different treatment options (telepractice and F2F).

Provider Attributes

I selected four provider attributes as the IVs. There were many more provider characteristics that were reported in the literature that I chose not to use: (a) gender, (b) ethnicity, (c) age, (d) years as a home visitor, (e) years of experience with all disabilities, (f) years of experience in one's professional discipline, (g) employment status, and (h) number of years working in one's current program (Campbell & Sawyer, 2007; Fleming et al., 2011; Peterson et al., 2007). I chose only four variables to accommodate my relatively small sample size.

I omitted the eight attributes mentioned above for several reasons. The gender and ethnicity of most providers is female and Caucasian (Campbell & Sawyer, 2007; Fleming et al., 2011; Peterson et al., 2007). Therefore, I would not expect interesting outcomes if I were to study those attributes. The age of the providers did not seem as relevant as the number of years of experience, and the number of years working in early intervention was included. I did not include number of years the provider worked as a home visitor because some therapists delivered FCEI in a clinic. I did not include employment status (i.e., contract, full-time, and part-time) as an IV; given my anticipated sample size, this variable could have generated numbers that were too small to produce statistically significant results. The following variables report on general characteristics that may not accurately describe the attributes of interest in my study: (a) years of experience with *all* disabilities, (b) years of experience in one's professional discipline, and (c) number of years working in one's current program.

Family-centered Early Intervention Provider Behaviors

I carefully selected four provider behaviors that were the DVs in my study. I eliminated behaviors when: (a) the provider behaviors could not be carried out using telepractice (i.e., directly teaching the child); (b) the provider behaviors did not illustrate participatory-based practices (i.e., transition, listening, or self-disclosure); and (c) the explanations of the provider behaviors were difficult to define (i.e., sensitive direction or sensitive facilitation).

Providers were Working with Children who were Deaf or Hard of Hearing

Children who were DHH were the population of interest. Based on my years working in early intervention, I am most familiar with this population. I have worked clinically, in a supervisory role, and taught FCEI principles at the pre-service and in-service levels.

Not a Comparative Effectiveness Study

Comparative effectiveness research has been used to compare different interventions and strategies (Arora et al., 2007). This approach could have been a reasonable and beneficial approach for my study. Another study could measure the comparative effectiveness of the use of FCEI provider strategies in both the telepractice and the F2F conditions. However, there was not sufficient time, nor a sufficient number of providers, to use this approach in my study. Another challenge to conducting a comparative effectiveness study was the use of different instruments to quantify the use of FCEI provider behaviors that were documented in the literature. The studies reported

in the literature used at least six different measurement tools. I chose to develop my own instrument because there was no consensus among the tools used in the literature.

Definitions

Two topics blended together in my study. One was family-centered early intervention (FCEI) provider behaviors. The second was telepractice. Both merit explicit definitions.

Family-centered Early Intervention Provider Behaviors

Researchers and practitioners include these types of behaviors in a family-centered early intervention model: (a) a child's caregivers are actively involved in the intervention; (b) a family's needs and desires determine service delivery; (c) professionals are agents of family members; (d) professionals intervene in ways that maximally promote family members' roles in decision-making; and (e) professionals work to identify and enhance each family member's capabilities and competencies (Brewer et al., 1989; Dunst, 2006; Dunst et al., 2002; Dunst et al., 1991; McBride et al., 1993; Powell, 1996; Trivette & Dunst, 2006). Family-centered early intervention practices include family members in collaborative decision-making, in goal setting, and in the treatment of their children (Hanft, 1988).

A family-centered approach to early intervention requires the therapist to have a unique set of knowledge and skills. Clinicians and researchers have identified almost 20 different participatory-based provider behaviors (Basu et al., 2010; Campbell & Sawyer, 2007; Colyvas et al., 2010; Friedman et al., 2012; McBride & Peterson, 1997). The FCEI

provider behaviors that were included in my study were gleaned from this body of evidence.

Telepractice

The terminology for this service delivery model is still emerging. Baker and Bufka (2011) stated, "Terms are frequently used interchangeably as there is yet no universal definition or term used by legislators, policymakers, government agencies, and payers" (p. 405). Consequently, many terms have been introduced to describe this service delivery model. Telemedicine provides medical services, delivered by a physician or at a hospital, from a distance (Darkins & Carey, 2000; Fong, Fong, & Li, 2011). Psychologists use the term telemental health or telepsychology (Koocher, 2007; Nelson & Bui, 2010; Nelson, Bui, & Velasquez, 2011; Rabinowitz, Brennan, Chumbler, Kobb, & Yellowlees, 2008; Richardson et al., 2009). Telerehabilitation is a broad term encompassing diagnosis and treatment provided by allied health professionals (i.e., speech-language pathologists, audiologists, occupational therapists, and physical therapists) (Brennan et al., 2010; Cason, 2009, 2011; Waite, 2010; Watzlaf, Moeini, Matusow, & Firouzan, 2011). Disciplines within the field of rehabilitation further refine the word "telerehabilitation" with these terms: tele-audiology (Hayes, Eclavea, Dreith, & Habte, 2012), tele-speech (Brennan et al., 2010), tele-therapy (Brennan et al., 2010; Cason, 2009; Koocher, 2007; McCullough, 2001; Waite, 2010), and telepractice (ASHA, 2005a, 2005b, 2010). In education, tele-school has been used (McCarthy, 2012).

To avoid confusion and to provide consistency for readability, I selected the term telepractice for this study. The term telepractice was selected, in part, because the American Speech-Language-Hearing Association (ASHA) defines service delivery at a

distance as “telepractice” for practitioners in audiology and speech-language pathology (ASHA, 2005a, 2005b, 2010).

Practically speaking, telepractice is the use of information and telecommunications technology to provide health services to people who are located at some distance from a provider (Alverson et al., 2004; Grigsby, Kaehny, Sandberg, Schlenker, & Shaughnessy, 1995; Grigsby, Rigby, Hiemstra, House, Olsson, & Whitten, 2002). Interactive video (IAV) utilizes videoconference technology to deliver health services in real time. This alleviates the effects of distance on access to care (Bashshur & Shannon, 2009).

CHAPTER II

LITERATURE REVIEW

For decades, individuals have utilized communication technologies as a means to relay or transmit health-related information (Bashshur & Shannon, 2009). In the past, if the technology did not exist or if it failed to do an adequate job, users sought and took advantage of new technological advancements to develop or enhance services. This is exactly what seems to be happening with the adoption of telepractice. By fully understanding the past, practitioners in medicine, rehabilitation, and early intervention can participate in shaping the future delivery of services. My intent in writing this literature review is to support the viability of telepractice and to consider its utility when delivering family-centered early intervention (FCEI) to children who are deaf or hard of hearing (DHH).

Telepractice is the use of telecommunication technologies to deliver health-related services and information to support patient care, administrative activities, and health education (Dixon et al., 2008). The combination of video conferencing technology and web-based software allow for synchronous two-way communication via the Internet. In practical terms for this study, telepractice is a service that is provided from a distance to a client—a FCEI provider and the parent of an infant or toddler who is DHH.

I find that this is an opportune time to explore the delivery of FCEI via telepractice. Telepractice is gaining global acceptance. Existing technology makes

access available (Alverson et al., 2008; Bashshur & Shannon, 2009; Cohn & Cason, 2012). Changes in technology make access affordable (Davis et al., 2012), and these technological advancements have been recently applied to the delivery of FCEI (Houston & Stredler-Brown, 2012).

The use of telepractice did not start with the delivery of FCEI. Rather, the use of telepractice started with a need to help those living in remote or rural areas to access services. Almost 15 years ago, Pickering et al. (1998) reviewed the difficulty some clients had accessing speech-language services in rural, Outback, and bush communities in six different countries: Australia, Canada, Hong Kong, South Africa, the United Kingdom, and the United States. Pickering et al. (1998) reported that access to services was challenging for a variety of reasons: (a) people living in remote communities may not have a speech language pathologist (SLP) practicing there; (b) unique linguistic characteristics of some people living in less-populated areas made it difficult to access services in the client's native language; and (c) it was difficult to identify providers who were aware of and respectful of the client's unique cultural identity. Speedie, Ferguson, Sanders, and Doarn (2008) discussed the potential for telepractice to revolutionize healthcare delivery. They pointed out that requisite technologies, such as interactive videoconferencing and store-and-forward mechanisms, now exist. Their work focused on the potential of telepractice to meet the demand for services without requiring patients to travel to the provider's location. More recently, Cason (2011) reported that telepractice supported these performance indicators for children accessing rehabilitation therapies: (a) timely receipt of services; (b) more consistent services due, in part, to fewer cancellations; and (c) delivery of services in a natural environment, such as the home.

Telepractice has been shown to mitigate provider shortages (Cason, 2011; Mashima & Doarn, 2008; McCarthy, Munoz, & White, 2010; Speedie et al., 2008). This same problem relates to the delivery of services to the child population in my study. Provider shortages are a constant challenge when trying to provide high quality services to children who are DHH (Halpin, Smith, Widen, & Chertoff, 2010; Krywko, 2012).

Even programs in urban areas have engaged in telepractice (McConnochie et al., 2005; Shaikh, Cole, Marcin, & Nesbitt, 2008). McConnochie et al. (2005) studied children in five childcare centers in a large city in the northeast region of the United States. Shaikh et al. (2008) conducted their investigation at a children's hospital in northern California. Utilization of telepractice in urban areas can reduce lost time at work and reduce the time between referral for services and the start of treatment (McConnochie et al., 2005). There can be cost savings related to travel and mileage reimbursement for families living in busy urban areas with high traffic volume.

A current challenge to telepractice is the lack of established models to regulate and finance this alternative healthcare system in the United States (Speedie et al., 2008). Programs are conducting telepractice without traditional reimbursement mechanisms (i.e., private insurance, Medicaid, and Medicare) (Brannon & Brown, 2012; Romanow & Brannon, 2010). Some programs rely on short-term grant funds (Hamren & Quigley, 2012; Hopkins et al., 2012; Simmons, 2012; Singh, Mathiassen, Stchura, & Astapova, 2010; Stith et al., 2012). The programs offering telepractice to infants and toddlers who are DHH, the population of interest in my study, also operate without regulations (Cohn & Cason, 2012) and, in many cases, without sustainable funding (Hopkins et al., 2012).

It seems accurate to say that telepractice has the potential to mitigate provider shortages when serving infants and toddlers who are DHH. However, the lack of regulations poses challenges. Some program administrators are reluctant to initiate telepractice until this practice is regulated and reimbursement is assured through traditional funding mechanisms.

The outcomes of my study may contribute information attesting to the viability of this service delivery platform. This information, in turn, may help launch telepractice in my field of study—FCEI with infants and toddlers who are DHH. It will become apparent in this literature review that the use of FCEI provider behaviors, in the traditional F2F condition, is a challenge. Telepractice, in theory, may impact the use of recommended FCEI provider behaviors. First, I will define family-centered early intervention. Later in the literature review, I will address the challenges associated with implementation of these practices.

Services to infants and toddlers with disabilities utilized professionally-centered practices for decades (Foley et al., 1994; Mahoney & Filer, 1996; Mahoney et al., 1999). This approach is also known as traditional therapy in which the provider presents the child with opportunities to learn and to practice new skills (Campbell & Sawyer, 2007; Dunst, Trivette, Humphries, Raab, & Roper, 2001; Powell, 1996). When delivering traditional therapy, the provider serves as an expert and provides directive intervention exclusively focused on the child (Campbell & Sawyer, 2007; Dunst et al., 2001; Powell, 1996). Parents were often relegated to the waiting room during the therapy session. Federal legislation and ensuing policies, however, promoted a major change to the traditional service delivery model for children with developmental disabilities.

In 1986, Congress passed the *Education of the Handicapped Act* (U.S. Congress, 1986). Part H of this law instructed programs delivering therapy to infants and toddlers with disabilities to consider the use of family-centered early intervention practices. A child's development continued to be a major outcome in FCEI. But, a child's development was no longer the *primary* focus of the intervention. Rather, professionals conducting FCEI were to address the parents as the primary beneficiaries of the intervention (Woods et al., 2011).

The wording in the original special education legislation presented a philosophical shift from extant traditional, professionally-centered therapy practices to what is now known as family-centered early intervention (FCEI) principles. Bodner-Johnson (2001) reported on this paradigm shift from traditional therapy to FCEI specifically for children who are DHH. By placing the parents in a primary role, professionals needed to consider, learn, and implement strategies appropriate for adult learners—the parents. Adherence to FCEI principles sets an expectation for parents to actively participate in their children's daily routines. It is this active participation on the part of parents that promotes positive outcomes for the child and the parents (Dunst & Trivette, 2009a; Dunst et al., 2006, 2007, 2008; Judge, 1997; King et al., 1999; Thompson et al., 1997). The delivery of FCEI to children who are DHH has been endorsed by several organizations (JCIH, 2007, 2013; Marge & Marge, 2005; Moeller, Carr, Seaver, Stredler-Brown, & Holzinger, 2013).

Researchers, administrators, and providers have investigated, explored, and attempted new strategies associated with FCEI practices for decades. Since the passage of P.L. 99-457 (U.S. Congress, 1986), many terms have been used to define and describe what is now called FCEI practices. These terms will be described in detail in the next

section. In addition to the common themes describing FCEI, there are pervasive and seemingly intractable challenges to implementation of this intervention model. These challenges were particularly relevant to my study. Family-centered early intervention is supported by legislation and associated policies. It is considered best practice (Dunst et al., 2002; Dunst et al., 1991; Espe-Sherwindt, 2008); and yet, implementation of FCEI practices seems hard to do (Campbell & Sawyer, 2007; Dunst & Trivette, 1996; Dunst et al., 2002; Dunst et al., 1991; Hebbeler et al., 2008; McBride et al., 1993; Peterson et al., 2007).

Terminology

Models of early intervention have been summarized along a "continuum" of practice (Dunst et al., 2002; Dunst et al., 1991; Espe-Sherwindt, 2008). These definitions offer a context for defining and understanding FCEI (see Figure 1).

Professionally-centered Intervention

A professionally led, or professionally-centered, service is at one end on a continuum. A professionally-centered model is synonymous with the traditional model of service delivery. It advances the role of the professional as an expert. The professional determines the needs of the child and the family members. In turn, family members depend on and are influenced by professional guidance.

Family-allied Intervention

A family-allied model is the next model along the continuum. This approach makes an attempt to focus on family members. Professionals view family members as capable of implementing interventions. Similar to the professionally-centered model, the

professional takes the lead during the intervention session and determines the needs of the child and family members.

Family-focused Intervention

The third approach, a family-focused model, extends the role and influence of family members. Family members are recognized as the consumers. Family members and professionals collaboratively define a family's needs. While the family members are given an opportunity to identify their priorities, it is the professional who offers options to the family members from which they select their main interests.

Family-centered Intervention

This model for delivering family-centered practice is at the other end of the continuum from professionally-centered intervention. Researchers and practitioners include these behaviors in a family-centered model: (a) a child's parents are actively involved in the intervention; (b) a family's needs and desires determine service delivery; (c) professionals are agents of family members; (d) professionals intervene in ways that maximally promote family members' roles in decision-making; and (e) professionals work to identify and enhance each family members' capabilities and competencies (Brewer et al., 1989; Dunst, 2006; Dunst et al., 2002; Dunst et al., 1991; McBride et al., 1993; Powell, 1996; Trivette & Dunst, 2006). Family-centered early intervention practices include family members in collaborative decision making, as it does in a family-focused model. In addition, however, FCEI practices also include family members in goal setting and in the treatment of their children (Hanft, 1988). A family-centered approach to early intervention requires therapists to have a unique set of knowledge and skills.

Legislation and Policies for Young Children with Disabilities

Federal legislation and associated policies support the delivery of FCEI practices to young children with disabilities. These same laws and policies apply to children who are DHH; these children represent one disability group among many and represented the population of interest in my study.

McBride et al. (1993) recognized that "Family-centered practices have been influenced by the intent of the legislation" (p. 414). Part H of the *Education of the Handicapped Act* (U.S. Congress, 1986) encouraged personnel in state programs to develop and implement comprehensive, coordinated, multidisciplinary systems of services for infants and toddlers and their families. Since 1986, amendments to this legislation have included increasingly more requirements for the delivery of FCEI (Dunst et al., 1991). Professional organizations have issued policies that have further reinforced the intent of the law. The legislation and associated policies will be described because it is important to acknowledge that the use of FCEI practices is not an option. The law requires the use of these practices. It is appropriate, then, to expect providers to utilize them.

Legislation

The fact that FCEI practices are legislated was critically important to my study. I will provide the evidence that use of FCEI practices is legislated.

***Individuals with Disabilities Education Act* (IDEA).** Repeated iterations of the *Individuals with Disabilities Education Act* (IDEA, 1990, 1997, 2004) provided critical guidance for the delivery of educational and therapeutic services to children with disabilities. The section of the law addressing services to infants and toddlers up to 36

months of age eventually changed from Part H to Part C. Federal regulations for Part C are passed at approximately 10-year intervals. These regulations further define implementation of the Part C legislation.

Federal regulations. Regulations for the Part C Early Intervention Program for Infants and Toddlers with Disabilities are published in the Code of Federal Regulations (Federal Register, 2011). The regulations have the force of law. The regulations provide guidance to state Part C agencies and are used to guide implementation of practices serving infants and toddlers with disabilities, birth through 2 years of age. The United States Department of Education has the responsibility for assuring the regulations are carried out. The law and the associated regulations clearly support the delivery of family-centered early intervention.

Policies

Personnel in the fields of early childhood education (ECE) and early childhood special education (ECSE) developed FCEI standards based on federal legislation and research. The National Association for the Education of Young Children (NAEYC) and the Division for Early Childhood (DEC), a subdivision of the Council for Exceptional Children (CEC), identified requisite knowledge and skills for early childhood special educators and early interventionists (Bricker & Widerstrom, 1996; Chandler et al., 2012; NAEYC, 2009; Sandall et al., 2005; Winton & McCollum, 2008). These professional standards embrace FCEI practices. Sandall et al. (2005) offer this definition of FCEI.

> A philosophy or way of thinking that leads to a set of practices in which families or parents are considered central and the most important decision maker in a child's life. More specifically, it [FCEI] recognizes that the family is the constant in a child's life and that service systems and personnel must support, respect, encourage, and enhance the strengths and competence of the family. (p. 119)

Legislation and Policies for Young Children who are Deaf or Hard of Hearing

Many professionals working with infants and toddlers who are DHH attest to the unique needs of this population (ASHA, 2013; ASHA-CED, 2006; Marge & Marge, 2005). The U.S. Congress initially passed and subsequently reauthorized legislation specific to infants and toddlers who are DHH (S. 3199—111th Congress, 2010; H.R. 1193 [106th], 1999). Both laws support implementation of FCEI practices with infants and toddlers who are DHH (JCIH, 2007, 2013; Marge & Marge, 2005).

Legislation

First passed in 1999 as the *Newborn and Infant Hearing Screening and Intervention Act*, this federal legislation authorized statewide newborn and infant hearing screening programs. The funding associated with this act resided in several federal agencies, and some of the funds were distributed to individual states. This act authorized diagnostic evaluation and intervention programs to be part of each state's newborn hearing system. Technical assistance, a national research program, and interagency and private sector collaboration for policy development are included in this original law.

The *Early Hearing Detection and Intervention Act of 2010* (S. 3199—111th Congress, 2010) expanded the focus on early intervention services. This reauthorized bill advocated for appropriate educational interventions for children identified as DHH. More specifically, the new legislation mentioned the recruitment, retention, education, and training of qualified personnel. State agencies were encouraged to ensure there was an adequate supply of qualified personnel to meet the early intervention needs of children in each state. The knowledge and skills of providers needed to adhere to the

requirements defined in the *Individuals with Disabilities Education Act* (IDEA, 2004). Practically speaking, the wording in this law (S. 3199—111th Congress, 2010) supports the compelling need for providers serving infants and toddlers who are DHH to use FCEI practices.

Policies

National and international policies define the scope of and the need to use FCEI practices with children who are DHH. In spite of the ongoing requirement for the application of FCEI practices, actual implementation presents a persistent challenge.

Joint Committee on Infant Hearing (JCIH, 2007). The *Year 2007 Position Statement of the JCIH* was written by representatives from medical and educational organizations. The position statement underscores the need for professionals to be trained in FCEI practices. The JCIH position statement asserts, "Professionals should be highly qualified in their respective fields and should be skilled communicators who are knowledgeable and sensitive to the importance of enhancing families' strengths and supporting their priorities" (pp. 909-910). Another basic tenet of this position statement is for all infants with confirmed permanent hearing loss to receive intervention services by 6 months of age in interdisciplinary intervention programs that recognize and build on strengths, informed choice, traditions, and cultural beliefs of each family. These principles are inextricably connected to the ideology of FCEI.

Joint Committee on Infant Hearing (Muse et al., 2013). This supplement to the previous position statement (JCIH, 2007) focuses exclusively on early intervention and outlines best practices to achieve optimal outcomes for the child and family members. Goal Three of the document states:

> All children who are deaf or hard of hearing birth to three years of age and their families have early intervention providers who have the professional qualifications and core knowledge and skills to optimize the child's development and child/family well-being. (p. 1328)

Consensus Conference on Effective Educational and Health Care Interventions for Infants and Young Children with Hearing Loss (Marge & Marge, 2005). There is ample research suggesting that professionals with specialized knowledge, skills, and experience working with infants and toddlers who are DHH and their families contribute to positive outcomes (Calderon, 2000; Moeller et al., 2007a, 2007b; Nittrouer & Burton, 2001; Yoshinaga-Itano, 2003). Based on these findings and persistent gaps in services among programs, leading experts in the field of hearing loss convened over the course of several years. The group generated recommendations for effective programming and implications for professional practice. In these studies of positive educational outcomes, each researcher made the point that well-prepared providers were an important factor. Support for the use of FCEI practices was given.

International Consensus Statement on Family-centered Early Intervention with Families of Children Who are Deaf and Hard of Hearing (Moeller et al., 2013). In 2012, an international panel of experts in early intervention convened in Bad Ischl, Austria, to come to consensus on best practice principles guiding the implementation of FCEI. The panel included parents, professionals who were deaf or hard of hearing, early intervention program leaders, early intervention providers, and researchers from around the world. Panel members observed that the majority of professionals in their respective countries agreed on the principles and practices that are foundational to FCEI. Ten agreed-upon principles were identified and refined. The goal of this effort was to promote widespread implementation of validated, evidence-based principles when

implementing FCEI with children who are DHH. Active efforts to accomplish this are underway in Upper Austria (D. Binder, personal communication, November 26, 2013; G. Carr, personal communication, December 16, 2013). I am not aware of any equivalent work in the United States.

Family-centered Early Intervention Practices

The use of family-centered principles predated federal legislation supporting services to infants and toddlers with disabilities. Early guidance for family-centered work with infants and toddlers with disabilities was established in the medical field (Brewer et al., 1989) and within the discipline of social work (Powell, 1996). Brewer et al. (1989) defined family-centered practice.

> Family-centered care is a philosophy of care in which the pivotal role of the family is recognized and respected in the lives of children with special needs. In this philosophy, families should be supported in their natural caregiving and decision-making roles by building on their unique strengths as people and families. Parents and professionals are seen as equals in a partnership committed to the development of optimal quality in the delivery of all levels of health care. (p. 1055)

It is important to prepare an explicit understanding of FCEI practices at the outset of my study. There is ample evidence requiring its use, and there is abundant support for its benefits (Dunst & Trivette, 2009a; Dunst et al., 2006, 2007, 2008; Judge, 1997; King et al., 1999; Thompson et al., 1997). Yet, uptake has been difficult (Campbell et al., 2009; Colyvas et al., 2010; Crais et al., 2006; Dunst et al., 1991; Dunst & Trivette, 1996; Fleming et al., 2011; McBride et al., 1993; Rush et al., 2003; Sheridan et al., 2009; Trivette et al., 1996a, 1996b). The delivery of FCEI via telepractice may increase the use of these practices.

Many functional characteristics of FCEI further define these practices. Some characteristics apply to the providers: (a) professionals view family members as equal partners; (b) professionals focus on strengthening and supporting the family members' confidence; and (c) providers supply information (Brewer et al., 1989; Dunst, 1999, 2006; Dunst et al., 2002; Dunst et al., 1991; Mahoney et al., 1999; McBride et al., 1993; Powell, 1996; Trivette & Dunst, 2006; Turnbull et al., 2007; Zaidman-Zait, 2007). Some features of FCEI practices relate to the caregivers: (a) family members identify their own needs which can include the needs of their child with disabilities and access to medical, financial, and respite services; (b) family members make many decisions with support from a provider; and (c) parents learn concrete strategies to use with their child with disabilities (Brewer et al., 1989; Dunst, 1999; Dunst, 2006; Dunst et al., 2002; Dunst et al., 1991; Mahoney et al., 1999; McBride et al., 1993; Powell, 1996; Trivette & Dunst, 2006; Turnbull et al., 2007; Zaidman-Zait, 2007).

A family-centered program includes relational and participatory strategies (Dunst et al., 2002). The relational strategies describe the professional's emotional orientation. The provider is expected to demonstrate warmth and empathy (Dunst & Trivette, 1996; Hanft et al., 2004; Jones, 1993). The use of active listening strategies (Rogers, 1961) can bring about changes in parents' attitudes toward themselves and others.

Participatory strategies are different than relational strategies. I explored the use of participatory strategies in particular. Participatory strategies are action oriented and include: (a) the sharing of information; and (b) helping family members learn new skills to use with their children (Campbell, 2004; Campbell & Sawyer, 2007; Dunst & Trivette,

1996; Hanft et al., 2004; Klass, 2003; Mahoney et al., 1999; Muma, 1998; Wasik & Bryant, 2001). These behaviors are explicit and can be readily identified.

In the last 10 years, coaching has become a popular and well-accepted process to deliver participatory strategies (Peterson et al., 2007; Rush & Shelden, 2005, 2011; Rush et al., 2003; Salisbury et al., 2010). Rush et al. (2003) described coaching as the method providers use to: (a) partner with parents; (b) share knowledge and skills; and (c) improve parent competence and confidence.

The three components of FCEI described by Rush et al. (2003) were integral to my study. My intent in this literature review is to help the reader to become familiar with these three components—relational, participatory, and coaching practices. I also reviewed a body of evidence defining specific FCEI behaviors within each of the three components (Basu et al., 2010; Campbell & Coletti, 2013; Campbell & Sawyer, 2007; Colyvas et al., 2010; Fleming et al., 2011; Friedman et al., 2012; McBride & Peterson, 1997; Peterson et al., 2007; Woods et al., 2011). I will describe these behaviors and justify my selection of specific FCEI provider behaviors for the study in the methodology chapter (Chapter III).

Relational Strategies

Positive, respectful, and collaborative relationships among provider and family members rely on trust, rapport, and respect (Fenichel & Eggbeer, 1992; Flaherty, 1999; Klein & Gilkerson, 2000). Parents are encouraged to communicate their opinions, their expectations, and their feelings (Jones, 1993; Stredler-Brown, 2011a, 2011b). Three themes describe relational strategies: (a) the provider serves as an information resource (Stredler-Brown, 2011a, 2011b; Stredler-Brown et al., 2004); (b) the provider offers

emotional support (Stredler-Brown, 2011b; Stredler-Brown et al., 2004); and (c) the provider helps parents recognize and access internal and external supports (Jackson, Traub, & Turnbull, 2008).

At first, I was interested in studying providers' use of relational strategies. In the methodology chapter (Chapter III), I discuss the reasons in favor of studying these behaviors, the challenges in doing so, and my reasons for not selecting these strategies for my study.

Information resource. The provider delivers technical information on many topics. Information answers family members' questions (Stredler-Brown, 2011b). Ideally, the information satisfies the amount of content parents want to learn (Stredler-Brown, 2011a). The provider need not be the "gatekeeper" of information. Rather, professionals can help parents access quality information from many sources including the Internet (DeConde Johnson & Seaton, 2011; Zaidman-Zait, 2007).

Emotional support. A time to reflect on and review events that transpired since the last session is included in a FCEI encounter (Stredler-Brown, 2011b; Stredler-Brown et al., 2004). As an active listener (Rogers, 1961), the provider can learn about family members' emotional experiences related to their young child. Providers can set the tone for the relationship by assuring parents they are listening to their questions, comfortable with their issues, and available to support them. Providers using FCEI practices demonstrated these qualities: (a) confidentiality and trustworthiness (DeConde Johnson & Seaton, 2011); (b) value and respect for family member's concerns (DeConde Johnson & Seaton, 2011); and (c) empathy and compassion (Dagirmanjian, Eron, & Lund, 2007).

Support systems. The provider can assist family members to identify and strengthen their unique supports (Dunst et al., 1991; Meadow-Orlans, Mertens, Sass-Lehrer, & Scott-Olson, 1997; Trivette & Dunst, 2006; Turnbull et al., 2007; Zaidman-Zait, 2007). Every family has supports; some are internal, and some are external (Jackson et al., 2008). Extended family members, friends, neighbors, and members of one's religious community are examples of informal supports. Formal supports include doctors, early intervention providers, and other agency personnel.

Participatory-based Practices

The provider behaviors included in my study were participatory-based behaviors. These behaviors are described in the literature using various terms including parent education (Mahoney et al., 1999), parent-mediated intervention (Hanft et al., 2004; Klass, 2003), and most recently, participatory-based practices (Campbell & Sawyer, 2007; Hebbeler et al., 2008; Ridgley & Snyder, 2010; Sandall et al., 2005; Wilson & Dunst, 2005; Woods et al., 2011). The provider is responsible for teaching parents specific skills or strategies to use with their child. Guidelines for the use of participatory-based strategies have been defined explicitly for children who are DHH (AG Bell, 2013).

Participatory-based practices promote children's learning as children are given opportunities to practice new behaviors. This is accomplished when parents incorporate effective strategies into their interactions with their children (Campbell, 2004; Mahoney et al., 1999). These practices are currently considered quintessential elements in the delivery of FCEI. The dependent variables in my study were taken from the context of participatory-based learning. For this reason, I provide a detailed description of the participatory-based learning process. It is important to note that this process is based on

F2F intervention. It is possible that the telepractice condition will require adjustments; some participatory-based learning behaviors may be used more frequently, and others may be used less regularly.

Participatory-based learning process. Researchers and practitioners agree on the behaviors used in the participatory-based learning process to help parents learn new skills (Dunst & Trivette, 2009a; Rush et al., 2003; Stredler-Brown et al., 2004). First, the provider and parent identify the value of learning a skill and the child outcomes that are expected. Then, the provider demonstrates the skill while actively engaging the parent in the activity. During this time, attention is focused on the child. The provider and the parents discover, together, the appropriateness and effectiveness of the technique based on the behaviors the child exhibits. Next, the parents practice the strategy. Learning theory has demonstrated that learners need to know how to *do it* versus just learning about implementation of a new technique (Joyce & Showers, 2002). Joyce and Showers (2002) contend that learners retain only 20% of information presented in a didactic format, while individuals retain 95% of information when it is provided with abundant opportunities to practice. Next, the provider and parent review the parent's use of the new skill. The provider offers feedback on the parent's technique. The parent and the provider discuss the parent's comfort using the technique. The last step is when the adults talk about the learning process and investigate ways to implement a new strategy in the future.

Coaching

Adult learning is an integral part of FCEI. Coaching is one popular approach to adult learning. Coaching is defined as a reciprocal process between a coach and a

learner—in the context of FCEI, the early intervention provider and the parent (Flaherty, 1999; Kinlaw, 1999; Rush et al., 2003). Each adult has his or her role. The coach brings specialized knowledge and skills about child development and specific intervention strategies to facilitate a child's growth (Kinlaw, 1999). The learner brings knowledge about his or her child's abilities, needs, and typical performance (Kinlaw, 1999). Documents issued by professional organizations endorse the use of coaching when working with infants and toddlers with disabilities (ASHA, 2008a, 2008b, 2008c; JCIH, 2007; Sandall et al., 2005).

Coaching utilizes agreed-upon adult learning principles (Dunst & Trivette, 2009a, 2009b; Espe-Sherwindt, 2008; Fleming et al., 2011; Rush et al., 2003; Woods et al., 2011). When approaching the parents of a child with a disability, the therapist is expected to identify teaching strategies that match the learning style of the parent (Wei, Darling-Hammond, Andree, Richardson, & Orphanos, 2009). Coaching in FCEI may extend beyond the adults. A coach may engage in a triadic relationship that includes the provider, the parents(s), and the child (Woods et al., 2011). Fleming et al. (2011) defined the roles of each of these participants; the provider teaches the parents, the parents teach the child, and the child learns through active participation in the intervention session. Kinlaw (1999) stated the primary goal of a coaching session is to support learners in making positive changes in their interactions with their child through a process of observation, action, and reflection. The collaborative and interactive coaching relationship nurtures the interactions among all participants in the triad (Espe-Sherwindt, 2008; Rush et al., 2003).

Rush et al. (2003) identified three key elements of coaching practice. Two elements affect the caregiver: (a) personal discovery (i.e., what the learner knows and desired learning); and (b) improved performance with a specific technique. One complex key element applies to the provider; good instruction, experimentation with new approaches, and problem solving. The coach makes judgments and uses behaviors based on the unique personality and learning style of the parent. Coaching is not a linear process; the individual situation determines the order in which coaching behaviors are used. That said, many guidelines have been published identifying coaching behaviors to advance a parent's or caregiver's learning (Dunst & Trivette, 2009a; Friedman et al., 2012; Rush et al., 2003; Stredler-Brown, 2005, 2008, 2009, 2011b; Stredler-Brown & Moeller, 2003; Stredler-Brown et al., 2004). These behaviors are defined within the context of my study. I selected four of these behaviors as the dependent variables.

Modeling. In the context of FCEI provider behaviors, the provider demonstrates, or models, a selected behavior that will be taught to the child (Campbell & Sawyer, 2007; Colyvas et al., 2010; Hanft et al., 2004; McBride & Peterson, 1997; Peterson et al., 2007; Woods et al., 2011). The provider and parent explore techniques that work and others that do not have the desired results (Stredler-Brown et al., 2004).

Observing. The provider watches the parent, the child, and/or the dynamics of the interaction between parent and child (Campbell & Coletti, 2013; Campbell & Sawyer, 2007; Colyvas et al., 2010; Hanft et al., 2004; McBride & Peterson, 1997; Salisbury & Cushing, 2013; Woods et al., 2011). Through observation, the provider and the parent identify the methods that support the child's participation and learning (Friedman et al., 2012).

The provider, as a coach, provides on-the-spot commentary (Stredler-Brown et al., 2004; Woods et al., 2011). This objective input provides immediate feedback to the parent during a teachable moment. On-the-spot commentary validates parents' behaviors by documenting what they are doing well (Stredler-Brown et al., 2004).

Asking and providing information. The parents' questions, interests, concerns and accomplishments are important and need to be addressed (Basu et al., 2010; Colyvas et al., 2010; Friedman et al., 2012; McBride & Peterson, 1997; Stredler-Brown, 2011, 2008; Woods et al., 2011). In addition, the coach may probe to elicit additional information or for clarification (Hanft et al., 2004). The family members' perspectives are of paramount importance because the specific strategies that are taught must suit both parent and child (Stredler-Brown, 2005, 2008, 2011b). Rush et al. (2003) stated, "The coach must ask the right questions at the right time and in the right way" (p. 41).

Evaluating. In an informal way, the provider, along with the parents, identify the child's skills before, during, and after the use of a specific strategy (Basu et al., 2010; Campbell & Sawyer, 2007; Friedman et al., 2012; Stredler-Brown et al., 2004). Evaluation requires a conscious effort for the provider to identify the child's current skill level and any perceived behavioral responses to the strategy being used.

In a family-centered approach, the evaluation also includes an assessment of the family members' use of new strategies. The parent ascertains his or her comfort using a particular strategy (Basu et al., 2010; Campbell & Sawyer, 2007; Friedman et al., 2012; Stredler-Brown et al., 2004).

Reflecting. Reflection is a vehicle to determine the effectiveness of an action or practice. The provider recognizes the effect of a strategy on three different participants;

the parent, the child, and the dynamic interaction between parent and child (Stredler-Brown et al., 2004). Reflection encourages the parent to use new strategies in future situations (Campbell & Coletti, 2013; Colyvas et al., 2010; Dunst & Trivette, 2009a, 2009b; Friedman et al., 2012; Hanft et al., 2004; Marturana & Woods, 2012; Rush et al., 2003). As the parent becomes comfortable using a new strategy, it is likely that the parent will use the strategy more frequently which, in turn, supports the child's learning. The parent can learn ways to share an effective strategy with family members and other caregivers who were not able to attend the therapy session.

Family-centered Early Intervention Strategies are Underutilized

Research from the field of early intervention for children with all types of disabilities suggests that the use of FCEI strategies has not been meeting the standards required by the law nor the standards set by policies and programs (Campbell & Sawyer, 2007; Dunst & Trivette, 1996; Dunst et al., 2002; Dunst et al., 1991; Hebbeler et al., 2008; McBride et al., 1993; Peterson et al., 2007). The following section presents this documentation in chronological order, starting in the 1990s and continuing to the present decade. The purpose of my study was to look at the potential of telepractice to remediate disappointing implementation of FCEI provider behaviors.

1990s

The introduction of FCEI started in the 1990s. The first iteration of Federal law (U.S. Congress, 1986) requiring the use of FCEI practices was issued in 1986. Five years later, Dunst et al. (1991) investigated the discrepancies between perceived and actual use of these practices. While state-level policymakers from the fields of education, health, and human services perceived the providers from their agencies to be using family-

centered practices, an evaluation of actual practice, from the perspective of the providers, was not in agreement. Providers in programs under the auspices of health agencies did report using primarily family-centered practices. Providers working in programs within education and human services agencies reported equal use of family-allied, family-focused, and family-centered practices. Dunst et al. (1991) reported, "These findings to a large degree represent an 'implementation lag' between establishing the parameters of a family-centered program and translating promulgated beliefs and recommended practices into actual service-delivery efforts" (p. 123).

McBride et al. (1993) developed practice indicators for each of the four models developed by Dunst et al. (1991) including professionally-centered practice, family-allied practice, family-focused practice, and family-centered practice. McBride et al. (1993) collected reports from 14 professionals. Most providers adhered to the principles of a family-allied model. Only a few providers were moving toward the use of family-focused or family-centered practices.

In 1996, Dunst and Trivette acknowledged that "the gap between what helpgivers say they do and what they actually practice will need to be narrowed before family-centered helpgiving becomes increasingly realized" (p. 337). Researchers reported that providers in most early intervention programs were delivering services that were more family-allied and family-focused than family-centered (Trivette, Dunst, & Hamby, 1996a, 1996b).

2000s

The challenging use of FCEI practices with infants and toddlers with different disabilities continued in the next decade. The research described in this section,

conducted from 2002–2008, provides data suggesting the use of FCEI participatory-based behaviors continues to occur less than 40% of the time (Campbell & Sawyer, 2007; Dunst et al., 2002; Hebbeler et al., 2008; Peterson et al., 2007). This is disappointing.

Dunst et al. (2002) studied the practices used by providers serving children, birth to 6 years of age, in two states. Parents receiving services from 22 programs defined the model that was used to work with their children who had or were at risk of developmental delays. The definitions by Dunst et al. (1991) were used. More than 250 parents completed the *Helpgiving Practices Scale* (Dunst & Trivette, 1996). Providers in nine programs (41%) implemented professionally-centered practices, and providers in six programs (27%) primarily used family-allied practices. Providers in only seven programs (32%) implemented family-centered practices. Dunst et al. (2002) further investigated the use of specific relational and participatory practices. As suspected, providers' use of relational and participatory practices was poor in the professionally-centered programs. Conversely, relational and participatory practices were used regularly when the providers engaged in family-centered practices.

These results were corroborated by a second study published at the same time by the same authors (Dunst et al., 2002). Forty-five mothers of children birth to 3 years of age were selected. Each child attended a different early intervention program for children with disabilities. Once again, the researchers asked mothers to complete the *Helpgiving Practices Scale* (Dunst & Trivette, 1996). Mothers who received services using a family-centered model reported that the providers' practices were more participatory. The use of participatory-based practices, the type of behaviors of interest in my study, occurred more frequently when FCEI practices were employed (Dunst et al., 2002).

Campbell and Sawyer (2007) used the *Natural Environments Rating Scale* (NERS) (Campbell & Sawyer, 2004), another parent-completed questionnaire, to document the characteristics of provider practices used by 50 professionals. Seventy percent of the parents reported their providers implemented a traditional, professionally-centered model of early intervention. Only 30% of the providers used a participation-based model. Campbell and Sawyer (2007) acknowledged that use of the traditional approach seemed to be in direct opposition to recommended practices. The researchers concluded that in spite of almost two decades of encouragement to use family-centered approaches, many interventionists were not applying these practices. The challenging use of participation-based practices persisted.

Peterson et al. (2007) studied 15 providers working with 28 children, under 36 months of age, with disabilities. Videotapes were analyzed according to four provider behaviors using the *Home Visit Observation Form* (McBride & Peterson, 1996). Providers spent 51% of their time teaching the child directly. This is considered a professionally-centered activity because the provider is teaching the child directly, rather than teaching the parent a strategy to be used with the child. Providers spent less than 33% of their time engaged in adult interactions; an interaction between parent and provider is considered a FCEI behavior. The next finding is surprising as this study was published only five years ago; less than 1% of providers' time was devoted to coaching the parents (Peterson et al., 2007).

Hebbeler et al. (2008) accessed the database of the National Early Intervention Longitudinal Study (NEILS) (Hebbeler et al., 2007). This rich database included FCEI programs in 20 states. The data reported here were collected from provider reports: (a)

44% of the providers focused primarily on the child; (b) 55% of the professionals focused on both the child and the parent; and (c) less than 1% of the providers focused mainly on adult caregivers. These figures are startling. At this point in time, the interest in FCEI and participation-based practices has been supported for almost 20 years. Yet, the use of these strategies is not yet the standard of care.

2010s

There is continued interest in studying the use of participatory-based behaviors in the current decade. My study seemed to be timely. Fleming et al. (2011) conducted a qualitative study in a large metropolitan area on the east coast of the United States. Thirty-one providers representing a variety of professional disciplines reported on their use of FCEI practices. Three themes, relevant to my study, emerged: (a) providers had a limited understanding of FCEI practices; (b) providers only infrequently taught parents strategies to facilitate the child's learning; and (c) consequently, the parents did not focus on facilitating their child's learning. The behaviors observed were predominantly professionally-centered practices (Dunst et al., 1991) including discussions about the child's development, the child's skills, and/or the child's deficits.

As recently as 2011, Woods et al. acknowledged that "despite policy, programmatic expectations, and professional development, a substantial gap exists between expected (recommended) and actual practices in Part C service delivery (p. 381). They continued, stating "home visits tend to be predominantly child focused, rather than supporting interaction between the parent and child" (p. 381).

Obstacles to the Use of Family-centered Early Intervention Practices

Research indicates a persistent lack of implementation of FCEI practices in the United States (Campbell & Sawyer, 2007; Dunst, 2002; Fleming et al., 2011). Internationally, implementation of FCEI practices was judged to be variable and inconsistent, at best, in developed countries around the world (Moeller et al., 2013). A major causal factor is the limited training of professionals, both pre-service and in-service, in the use of FCEI strategies (Campbell et al., 2009; Colyvas et al., 2010; Crais et al., 2006; Fleming et al., 2011; Sheridan et al., 2009). The content from pre-service training programs for teachers of the deaf/hard of hearing, speech/language pathologists, and audiologists may not include coursework or practicum using these practices (Jones & Ewing, 2002; Luterman & Kurtzer-White, 1999; Meadow-Orlans, Mertens & Sass-Lehrer, 2003; Rice & Lenihan, 2005; Roush, Harrison, Palsha & Davidson, 1992; Roush et al., 2004).

Another contributing factor is that some parents may question the use of FCEI provider behaviors. Studies have reported that families are satisfied with professionally-centered intervention (McBride et al., 1993), and some families expect the professional to focus on the child (McWilliam, Tocci, & Harbin, 1995). In the past, families may not have been informed about FCEI practices (McWilliam et al., 1995). Families received the type of intervention that was offered without having a choice or an expectation that different types of intervention models existed.

While there have been persistent efforts to offer training in the use of FCEI provider practices over the last several decades, research demonstrates that these provider skills are still lacking. I believe telepractice will have a positive impact on the use of

FCEI provider behaviors. One reason is related to training; as providers learn to use the technology associated with telepractice, they can be instructed in the importance of and application of FCEI behaviors. This potential was a primary motivator for my study.

Telepractice May Facilitate Use of Family-centered Early Intervention Practices

The main intent of telepractice is to provide access to qualified practitioners for families living in remote or rural areas. But, sometimes opportunities for change are incidental. The combination of video conferencing technology and web-based software supporting synchronous two-way communication has created new opportunities for the delivery of FCEI (Houston & Stredler-Brown, 2012). Many researchers, program administrators, and practitioners anticipate that the use of relational, participatory-based, and coaching practices will be enhanced through telepractice (Blaiser et al., 2012; Broekelmann, 2012; Davis et al., 2012; Hamren & Quigley, 2012; Hopkins et al., 2012; Houston & Behl, 2012; McCarthy, 2012; Olsen et al., 2012; Peters-Lalios, 2012). I agree, based on my experience.

Mothers stated that their active involvement in the early intervention sessions is helpful (Harrison, Romer, Simon, & Schultze, 2007). Telepractice, by its very nature, promotes active parental involvement with their children during FCEI sessions.

Olsen et al. (2012) described the successful delivery of early intervention services to 36 families whose children, birth to 3 years of age, had a variety of developmental disabilities. Over the course of two years, 187 early intervention sessions were recorded and analyzed; 61 of these visits were delivered in the face-to-face (F2F) condition, and 126 sessions were conducted via telepractice. Coaching occurred more often during telepractice sessions than in traditional F2F visits, and this difference was statistically

significant ($p = 0.011$). Consistent with coaching practices, parents talked with providers more about their own use of strategies to improve their children's development during telepractice sessions than in F2F visits.

When the intervention was remotely delivered, interaction between professionals and the parents became the primary activity in the study by Olsen et al. (2012). Telepractice delivery was consistent with a coaching model: (a) providers listened to what parents had to say about their child's development; (b) providers watched parents interacting with their children; (c) providers offered feedback; and (d) providers suggested ways parents could interact to promote the child's use of desired skills (Olsen et al., 2012). I chose provider behaviors for my study that match several of these criteria.

Programmatic Support

Houston and Behl (2012) reported on providers' use of coaching strategies via telepractice conducted with infants, toddlers, and young children who were DHH. Due, in large part, to the fact that the professional was not physically in the room with the child and the parent, the parent took control of the interaction with the child. One parent stated, "As his mom, I'm doing all of the activities with him—not the early interventionist. During the traditional home visits, I usually sat and watched her [the provider] do everything" (D. Behl, personal communication, September 16, 2013).

Several other programs acknowledge the natural integration of FCEI practices when services are delivered via telepractice. The ihear program, operated through the St. Joseph Institute for the Deaf in St. Louis, Missouri, utilizes the coaching process to deliver therapy to children enrolled in their program (Broekelmann, 2012). The early interventionist, acting as a coach, supports and encourages parents as they learn and

practice new strategies (Hopkins et al., 2012). Telepractice supports the triadic model described by Woods et al. (2011). Blaiser et al. (2012) reported that parents (not the interventionist) were the primary facilitators of their child's communication development.

Provider Support

Providers reported that the telepractice model provided opportunities to improve the parents' skills within a session because the use of distance technologies necessitates the active participation of the parents (Blaiser et al., 2012; Broekelmann, 2012; Davis et al., 2012; Hamren & Quigley, 2012; Hopkins et al., 2012; Houston & Behl, 2012; Houston & Stredler-Brown, 2012; McCarthy, 2012; McCarthy et al., 2012; Olsen et al., 2012; Peters-Lalios, 2012). Because the professional is not immediately available to step into an activity, the parent becomes the primary, or exclusive, facilitator of the child's communication and language (Hamren & Quigley, 2012). Parents were empowered by their providers and had increased opportunities to learn new information (Davis et al., 2012). Parent participation was key to the success of Auditory-Verbal practice (Peters-Lalios, 2012); and, parent participation was integral to realizing the benefits of telepractice (Olsen et al., 2012; Peters-Lalios, 2012).

Historical Support for Telepractice

This section follows the emergence of telepractice in the medical field, its uptake in the field of psychology, past and current interest in the field of speech-language pathology, and nascent efforts in early intervention. Reported studies focus on treatment, rather than assessment. This section is important to the current study because my study investigated the relatively new application of telepractice in the field of family-centered

early intervention. The reasons for the emerging interest in telepractice within FCEI practice are the same as those discussed in the historical evolution of telepractice.

Medical Practice Supports Telepractice

The medical profession was an early adopter of telepractice. Telepractice distributed limited resources, increased access to services, and closed gaps in health disparities (Hailey, Roine, & Ohinmaa, 2002). Telepractice has been associated with decreased costs for services and improved health and wellness for recipients of care (Harper, 2006; Marcin et al., 2004). I selected five specialty areas from the healthcare profession to demonstrate the effective use of telepractice in the medical field: absence from childcare due to illness, dermatology, childhood obesity, psychiatry, and services delivered to children with special health care needs (CSHCN). These disciplines were selected for several reasons. Young children in childcare settings may need to leave the daycare setting if they appear to be sick, and their parents may miss time at work when they are asked to take the child to a doctor (McConnochie et al., 2005). The ensuing absence from childcare due to illness has had health, education, and economic ramifications for families in urban areas (McConnochie et al., 2005). The application of telepractice in the field of dermatology had *longitudinal studies* of care (Bowns, Collins, Walters, & McDonagh, 2006; Loane et al., 2001). Studies on childhood obesity utilized study designs to measure *client outcomes*, and client outcome measures are considered more informative than measurements of client satisfaction (Mulgrew, Ulfat, & Nettiksimmons, 2011; Shaikh et al., 2008). A study from psychiatry was of interest because it addressed the ability to establish meaningful adult-to-adult relationships remotely (Hilty, Nesbitt, Kuenneth, Cruz, & Hales, 2007). And, research conducted with

the CSHCN population has implications for the field of speech-language pathology (Harper, 2006).

The use of telemedicine in the medical field, as it relates to the fields of dermatology, childhood obesity, psychiatry, and children with special health care needs, suggests telepractice is an effective service delivery platform that is also convenient, timely, and cost effective. Furthermore, clients are generally satisfied with the services (Bowns et al., 2006; Hilty et al., 2007; Mulgrew et al., 2011). Medical research is the starting point in my report on the historical use of telepractice.

Absence from childcare due to illness. McConnochie et al. (2005) investigated the impact of telepractice on children's absence from childcare due to illness (ADI). This study was conducted in New York City and engaged five childcare centers from impoverished inner-city neighborhoods. The intent was to learn if the use of telepractice impacted attendance in childcare. The investigators collected baseline child attendance data for 18 weeks before initiating telepractice. The results were positive; after telepractice was implemented, there was a 63% reduction in children's absence from childcare due to illness. Telepractice addressed health-related issues quickly and effectively. Parents were not required to leave their own workplace to take their children home. Medical providers were promptly available—within an average of 30 minutes from the time the service was requested. This speed of response was deemed beneficial to all parties—daycare providers, parents, and children.

The study by McConnochie et al. (2005) related to my investigation in two ways. The study was conducted in urban settings. This expands the implementation of telepractice beyond the original intent to reach people living in remote or rural

communities. Some of the centers providing telepractice to infants and toddlers who are DHH include children living in urban areas. And, one outcome of the study by McConnochie et al. (2005) related to the actions of providers; medical doctors responded promptly and effectively. My study considered providers as the unit of analysis. I studied the behaviors of the providers; I investigated attributes of providers that were related to changes in the use of FCEI practices.

Dermatology. The United Kingdom's Multicentre Teledermatology Trial was one of the world's largest telepractice research trials (Loane et al., 2001). In 2000, Loane et al. established the clinical effectiveness and cost-effectiveness of using telepractice conducted in real time (RT) versus store-and-forward (S&F) mechanisms. A general practitioner saw each patient in the office, while the patient received a consultation with a dermatologist located at a remote site. The study used a repeated measures design; all patients were seen in both telepractice conditions—RT and S&F. The results of this study demonstrated that telepractice conducted in RT was more efficient. Telepractice was conducted in RT in my study.

Bowns et al. (2006) investigated diagnosis and treatment of dermatological disorders in both F2F and telepractice conditions in the United Kingdom. Based on the *Patient Satisfaction Questionnaire* (PSQ) (Ware, Snyder, Wright, & Davies, 1983), there was no statistical difference between the two groups. Seventy-six percent of the patients preferred to receive services remotely, rather than wait for a F2F appointment. Responses to another question indicated that only 38% of the patients preferred to discuss their condition in person.

There were two issues uncovered in the studies from the field of dermatology that applied to my study. My study reviewed sessions conducted in real time (Loane et al., 2001). The work by Bowns et al. (2006) affirmed that patients were satisfied with telepractice. This was encouraging.

Childhood obesity. Articles on childhood obesity studied measures of both satisfaction and, more importantly, client outcomes. Shaikh et al. (2008) conducted a survey in California focused on patient outcomes as a result of telepractice consultations. Child outcomes included: (a) improvements in patient nutrition, (b) increased activity levels, and/or (c) changes in weight. Results of this study showed that 80.6% of the patients receiving telepractice improved their diet, 69.4% demonstrated increased activity levels, 21% exhibited a slower rate of weight gain or weight maintenance, and 22.6% exhibited weight reduction.

Mulgrew et al. (2011) studied patient satisfaction as an indicator of the effectiveness of telepractice. The parents of children diagnosed as obese were exposed to both forms of healthcare delivery—F2F and telepractice. Mulgrew et al. (2011) noted no difference in overall parent satisfaction between the two groups. Parents reported that the provider using telepractice gave easy-to-understand directions. Parents were comfortable discussing their children's health problems. That said, parents rated telepractice visits slightly lower than F2F visits when asked if the provider explained things about the child's health in a way that was easy to understand. The authors suggested this concern might be due to the lack of access to visual support materials. If this were true, the criticism could be ameliorated easily. Studies have shown that visual support materials can be made available using a document reader, by mailing printed materials, and making

materials available on a website (Wade, Wolfe, Brown, & Pestian, 2005; Wilson & Wells, 2009). Providers working via telepractice have used these approaches to access materials with infants and toddlers who are DHH (Blaiser et al., 2012; Davis et al., 2012; Hopkins et al., 2012; McCarthy, 2012; Simmons, 2012).

Psychiatry. I elected to investigate the use of telepractice in the field of psychiatry because a psychiatrist must establish a good working relationship with a client remotely; this applies to the relationship between provider and parent in FCEI (Jackson et al., 2008; Jones, 1993). Hilty et al. (2007) studied the impact of psychiatry delivered through telepractice using reports of participant satisfaction. The opinions of all participants were solicited—patients, primary care providers (PCP), and participating psychiatrists. Reported on a 5-point Likert scale, all participant groups' means indicated satisfaction with the telepractice model. The patient mean on the topic of being able to talk freely was 4.49. The patient mean on the topic of having needs met was 4.28. PCPs rated the quality of consultations at a mean of 4.83. The researchers noted that satisfaction with telepractice might have reflected the existing shortage of psychiatric providers in rural areas; satisfaction was statistically higher for clients living in rural areas than suburban neighborhoods (Hilty et al., 2007).

Children with special health care needs (CSHCN). An interdisciplinary team conducted evaluations of children on the CSHCN registry in Iowa (Harper, 2006) to compare services delivered through telepractice and in the F2F condition. Professionals worked in general practice (e.g., physicians and nurses), rehabilitation (e.g., social workers, psychologists, and speech-language pathologists), and education. Groups of clients were matched for age, gender, socio-economic status (SES), and type of disability.

A 55-item satisfaction survey, completed by parents and professionals, was conducted by phone. Parents in the telemedicine group viewed the consultations as at least as effective as direct onsite evaluations. A subgroup of parents experienced both F2F and telepractice conditions; they reported no significant differences in their ratings of the two experiences according to: (a) quality of care; (b) allocation of physician and professional time; and (c) ease of making appointments. Many professionals gave positive evaluations. Providers' reports about telepractice stated it offered access to higher quality care, generated positive feedback from patients, had higher participation rates, and was a productive use of their professional time.

Marcin et al. (2004) investigated access to subspecialty consultations by children on the CSHCN registry in California. Satisfaction with telepractice, delivered by specialty consultants, was determined using a 5-point Likert scale of satisfaction. Surveys were distributed to parents and primary providers (primary care providers and physician assistants). Parents were asked five questions regarding: (a) training of staff; (b) ability to talk freely; (c) having needs met; (d) understanding the consultant; and (e) overall satisfaction. PCPs and physician assistants (PAs) were asked to address these topics: (a) quality of the video; (b) quality of the audio; (c) confidence performing the examination; (d) understanding the consultant providing the service; and (e) overall satisfaction. Parents rated all questions in the 4-5 range, and 98% wanted to continue receiving consultations through telepractice. The PCPs and the PAs also scored all responses in the 4-5 range; scores for providers were even higher than those for parents.

The studies with children with special health care needs (Harper, 2006; Marcin et al., 2004) generated positive reports from providers; providers reported telepractice to be

a productive use of their time. My study focused on providers of FCEI as the unit of analysis.

Telepractice in Rehabilitation Fields

Following the implementation of telepractice in the medical field, practitioners in several rehabilitation disciplines initiated trials with telepractice. Telepractice delivered in the rehabilitation disciplines are discussed in this section. The extension of telepractice to rehabilitation brings this service delivery platform ever closer to the field of early intervention.

Practitioners in psychology were pioneers in addressing the lack of trained professionals in rural and remote areas (Rabinowitz et al., 2008). Soon after, telepractice emerged in the fields of speech-language pathology and audiology. Uptake by early interventionists, serving children birth to 3 years of age, has been more recent.

Psychology

Telepsychology, or e-therapy, is defined as the use of real-time videoconferencing for the interaction of client and practitioner in the provision of psychological services that are usually delivered in person (Nelson & Bui, 2010). The American Counseling Association and the National Association of Social Workers endorsed the delivery of psychological services through telepractice (Epstein, 2011). The National Board of Certified Counselors also supported telepractice (Gournaris, 2009). Short of an endorsement, the American Psychological Association mentions e-therapy in its code of ethics as one of several therapeutic modalities (Epstein, 2011).

In psychology, working alliance is a term used to describe the relationship between provider and client (Cook & Doyle, 2002). Family-centered early intervention

also requires the adults—provider and parent—to develop an effective relationship (Dunst & Trivette, 1996; Hanft et al., 2004; Jones, 1993). The studies from the field of psychology provide convincing evidence that this type of relationship can be formed via telepractice.

Rabinowitz et al. (2008) reviewed 380 studies using telepractice. Of these, only 14 studies had sample sizes greater than 10 and incorporated objective assessments and/or satisfaction surveys. Rabinowitz et al. (2008) stated the need for multi-site investigations on diverse ethnic populations using outcome variables other than satisfaction. This need in the related rehabilitation field of speech-language pathology motivated me to select this topic for my study.

Nelson, Barnard, and Cain (2006) evaluated cognitive-behavioral therapy (CBT) treatment for childhood depression using traditional F2F treatment and interactive televideo (ITV) (aka, telepractice). There were two strengths to the design of this study. One was the random assignment of clients to either F2F or telepractice settings. The other was that both the F2F treatment and the telepractice treatment were implemented in a clinic so that clients traveled to receive services in both conditions. The results showed that CBT treatment across both delivery methods was effective in decreasing depressive symptoms. One measure of success was that 23 out of the 28 clients no longer met depression criteria at the end of treatment.

Wade et al. (2005) examined the feasibility and efficacy of using a hybrid approach (Nelson et al., 2006) that included both telepractice sessions and the use of web-based modules with children diagnosed with traumatic brain injury (TBI). Each child received weekly sessions with the therapist. In addition, families accessed 7 to 11

online self-guided sessions on the Web. The results measured satisfaction with services from three perspectives—the children, the parents, and siblings. Participants rated telepractice sessions as *very* to *extremely helpful*. The children with TBI did not rate the services quite as favorably as did their parents or their siblings, but this distinction was not statistically significant. The parents of all but one child reported improvements in the behavior problems exhibited by their children.

Nelson and Bui (2010) conducted a case study of one child and her mother using telepractice. Eight sessions were delivered over the course of four months with maintenance therapy one time each month thereafter. The *Behavior Assessment System for Children* (Reynolds & Kamphaus, 1992) was used to measure therapy outcomes. At the end of treatment, the child's performance fell in the non-clinical range in all areas. This improvement was paired with a report of more adaptive functioning at home.

Some researchers investigated specific treatment effects. For instance, working alliance is a central component of successful psychotherapy (Cook & Doyle, 2002). Working alliance, in psychology, is measured according to three subscales on the *Working Alliance Inventory* (WAI) (Horvath & Greenberg, 1989): task, bonds, and goals. The task subscale measures collaboration between therapeutic partners—therapists and clients—on specific in-session behaviors. The subscale for goals measures the degree to which therapists and clients agree on the desired therapy outcomes. The bonds subtest looks at the quality of the human relationship between therapists and clients (i.e., trust and attachment). Working alliance was of interest in my study in that the telepractice condition may be perceived by some to limit or alter the quality of a relationship.

Cook and Doyle (2002) investigated the development of working alliance through telepractice with participants in the United States and Canada. Adult clients ranged in age from 19 to 80 years. Clients received individual counseling services for a variety of problems. The results showed no significant differences or trends on any of the subscales or the composite score of the WAI based on the type of presenting problem. Of most importance, all subscales and the composite score were actually higher for the telepractice group. Clients and therapists reported a positive experience and suggested, "An empathic relationship can be strongly established regardless of modality of communication" (p. 102). Those who used a hybrid approach (e.g., more than one modality such as therapy and phone or therapy and e-mail) had even higher composite and subscale scores on the WAI.

Corroborating the findings by Cook and Doyle (2002), Preschl, Maercker, and Wagner (2011) compared working alliance with clients receiving CBT in the F2F condition and via telepractice. The strength of this study was its experimental design and the number of participants. The researchers randomized clients to F2F therapy (n = 28) or telepractice (n = 25). Two measurements were used. The *Beck Depression Inventory* (BDI) (Beck, Steer, & Brown, 1996) was completed post-treatment. The German version of the *Working Alliance Inventory* (WAI) was completed at the middle and end of intervention. Results demonstrated that the two groups did not differ significantly in ratings of working alliance. The therapists even rated the tasks subscale on the WAI significantly higher for the group receiving telepractice. The results were promising. Results were based on experimental design, supported the effectiveness of telepractice, and corroborated previous research.

The studies by Cook and Doyle (2002) and Preschl et al. (2011) provided me with assurance that providers could successfully use relational strategies, a part of FCEI; and parents of infants and toddlers who are DHH could effectively connect to the provider, on an emotional level. It was this assurance from the literature (Cook & Doyle, 2002; Preschl et al., 2011) that made me comfortable enough to study telepractice in the field of family-centered early intervention.

Speech-language Pathology

The providers in this current study offered intervention to children who were deaf or hard of hearing (DHH). As expected, many of the providers were speech-language pathologists and audiologists (Arehart et al., 1998; Stredler-Brown & Arehart, 2000). Support for telepractice from the American Speech, Language, Hearing Association (ASHA) is critical in order for telepractice to move forward. Fortunately, this assurance is forthcoming.

The position statement of ASHA (2005a) supports emerging efforts in telepractice and states,

> Telepractice is an appropriate model of service delivery for the profession of speech-language pathology. Telepractice may be used to overcome barriers of access to services caused by distance, unavailability of specialists and/or subspecialists, and impaired mobility. Telepractice offers the potential to extend clinical services to remote, rural, and underserved populations and to culturally and linguistically diverse populations. (p. 1)

ASHA has specified parameters for standards of practice that are consistent with its code of ethics (ASHA, 2010). While not an endorsement, per se, these documents support the advancement of telepractice (ASHA, 2005b, 2010).

This review of the literature in the field of speech-language pathology briefly describes the proof of concept for telepractice (Mashima & Doarn, 2008; Theodoros,

2008, 2011). A proof of concept verifies that a concept, such as telepractice, has the potential for real-world application. I will provide a short review of studies on adults, with varying types of disorders (Clark, Dawson, Scheideman-Miller, & Post, 2002; Constantinescu et al., 2011; Howell, Tripoliti, & Pring, 2009; Mashima et al., 2003; Theodoros et al., 2006). The focus shifts to the use of telepractice to treat pediatric clients with various speech and language disorders in the United States (Forducey, 2006; Grogan-Johnson, Alvares, Rowan, & Creaghead, 2010) and in other countries (McCullough, 2001; Rose et al., 2000; Sicotte, Lehoux, Fortier-Blanc, & Leblanc, 2003; Waite, Cahill, Theodoros, Busuttin, & Russell, 2006). Whenever possible, I selected studies that used empirical methods of research with controlled samples. It should be noted, however, that there was a persistent request by many of the researchers to conduct studies with more rigorous design methodologies as most studies, to date, did not meet a high criteria of evidence: a large sample size, statistical analyses, or randomization of participants to treatment groups (Reynolds, Vick, & Haak, 2009).

Proof of concept. A 2008 study by Theodoros suggested practitioners and administrators look at telepractice and "the importance of service delivery models that are flexible, responsive to individual needs, and sustainable" (p. 222). An overview of the literature conducted in 2008 by Mashima and Doarn made a statement that holds true today. Of the 40 articles reviewed by the authors, most were pilot studies and provided anecdotal accounts, rather than reports on well-controlled, randomized, clinical trials.

More recently, Theodoros (2011) presented some new and forward-thinking ideas. While there was a need for telepractice to provide access to those living in rural or remote geographic areas, new considerations support the use of telepractice in urban areas as

well. Some of the factors that limit access to speech-language services in urban areas are the client's disability, the client's mobility, financial issues (e.g., cost to travel to a center), restrictive work schedules, and family support needs.

Adults. The studies with adult clients with speech-language disorders demonstrate that services delivered via telepractice can produce successful client outcomes. This was meaningful in the context of my study; in FCEI, the providers focus their instruction on adults also. In family-centered early intervention, the provider attempts to develop a parent's skills. The children who are DHH will be the ultimate beneficiaries of the provider's efforts to instruct the parent and, subsequently, the parent's ability to use prescribed strategies with the child.

Clark et al. (2002) followed one stroke patient who received 62 speech-language treatment sessions via telepractice. The client's performance was evaluated using the *Functional Communication Measure* (FCM) (ASHA, 2003) before and after treatment. The client demonstrated improvement in all areas of the FCM.

Four treatment studies investigated the feasibility and validity of providing the Lee Silverman Voice Treatment using telepractice with clients with Parkinson's Disease (PD) (Constantinescu et al., 2011; Howell et al., 2009; Mashima et al., 2003; Theodoros et al., 2006). Clients in the Howell et al. (2009) study demonstrated significant progress in sustained phonation, reading, and conversational speech. The 10 clients in the study conducted by Theodoros et al. (2006) showed significant improvements on measures of vowel prolongation, reading and conversational monologue, and pitch range. More recently, Constantinescu et al. (2011) conducted a randomized controlled trial with 34 clients with PD and found no significant difference between participants randomly

assigned to F2F and telepractice treatment conditions when tested for sustained vowel phonation, reading, and monologue. Mashima et al. (2003) compared the outcomes of 51 individuals who received voice treatment and were randomly assigned to either F2F (n = 28) or telepractice (n = 23) treatment conditions. Results indicated no significant difference between groups for voice quality perceptual measures, acoustic changes for jitter and shimmer, and laryngeal changes.

Pediatrics. Forducey (2006) advocated for the use of telepractice with children with varying types of speech and language disorders. Other studies focused on experimental treatment of a variety of disorders in the pediatric population in the United States (Grogan-Johnson et al., 2010; Jessiman, 2003), in Ireland (Rose et al., 2000), in the United Kingdom (McCullough, 2001), and in Canada (Sicotte et al., 2003). The findings in pediatric studies related more closely to the population in my study—young children who were DHH. The providers were often speech-language pathologists (Arehart et al., 1998; Stredler-Brown & Arehart, 2000).

Speech TeleTherapy was recognized by the Oklahoma Department of Education as an alternative to on-site speech services for children in rural and remote areas (Forducey, 2006). The Speech TeleTherapy program utilized real-time, two-way interactive videoconferencing throughout the state with school-age children. Five part-time speech language pathologists (SLPs) provided more than 11,000 sessions to 99 students in seven school districts. Anecdotal reports from the SLPs reported that students actively participated and accomplished their speech and language goals. Administrators at the building and district levels supported the project, stating that telepractice provided

consistent services that had been previously inaccessible. Administrative support for telepractice is essential in order for this service delivery platform to gain momentum.

Fluency. Sicotte et al. (2003) followed students with a diagnosis of stuttering living in Montreal, Canada. Each student attended two 1-hour treatment sessions with a parent. An analysis of fluency was conducted by measuring the percent of syllables stuttered (PSS) as a dependent variable. Videos of each student were made two times before the therapy started, two times when the therapy ended, and three times during maintenance after termination. Overall, there was a 52% decrease in stuttering for these students. This was laudable given the short duration of therapy compared to studies conducted in the F2F condition. The researchers stated that "this type of intervention is more demanding for the clinician, particularly when it comes to dealing with young children, and for parents, who must take an active role during treatment" (p. 57). The perceived demands on the clinicians in this study were notable.

Articulation and language. Four studies examined the treatment of a variety of communication disorders among preschool and school-aged children (Grogan-Johnson et al., 2010; Jessiman, 2003; McCullough, 2001; Rose et al., 2000). All had favorable outcomes for telepractice services.

An early effort in the United Kingdom studied preschool-aged children (Rose et al., 2000). This three-year research project investigated quality of therapy and clinical effectiveness of treatment. The evaluation considered two models of therapy—telepractice and traditional F2F therapy. Parents reported overall satisfaction with minimal reservations about telepractice. Unfortunately, at the time of publication, no firm conclusions were made based on child outcome measures.

McCullough (2001) provided services to five preschool-age children in Belfast, Ireland. The Attract Project explored the benefits of telepractice to child, parent, and clinician. This non-randomized feasibility study was conducted with four clients with Down's syndrome (n = 3) and Cornelia de Lange syndrome (n = 1) and used surveys to measure parent satisfaction. The survey response rate was 89%. Responses to the survey were measured on a Likert scale with 5 points or by answering yes/no questions. In response to questions about their children's improvement, the mean parent score was 4.7.

Two questions posed to the parents in this study address characteristics of FCEI. In response to the query, "Was the system useful in developing your skills with your child?" parents answered that the program was *very useful* (score of 5/5). When asked if the system enabled the parents to feel part of the therapy program, parents also answered that it was *very useful* (score of 5/5). Parents reported that their knowledge of their children's language development improved (4/5). They resoundingly answered that they would miss the opportunity to receive services through telepractice when the project ended. The therapist reported substantial improvements in the children's receptive and expressive vocabulary and vocal imitation skills according to informal records. One limitation to this study, so prevalent in the literature, is the absence of quantifiable or statistically measured outcomes.

An investigation by Jessiman (2003) included the treatment of two children using telepractice. The children, aged 7 years, and 5 years 4 months, received bi-weekly therapy sessions for a two-month period. Several articulation and language goals were targeted. Although there was no control group for comparison, Jessiman reported that both children made promising gains in their speech and language skills. Jessiman

concluded that this improvement was partly due to the intervention, as no improvement was observed for three months between the initial assessment and the start of therapy. Questionnaires revealed that parents were satisfied with the improvements using telepractice.

Of interest was the recent study conducted by Grogan-Johnson et al. (2010) in Ohio. This study compared F2F therapy with telepractice using random assignment to one of the two treatment groups. Each child experienced both treatment conditions. Each student experienced one treatment condition for four months before switching to the other treatment mode. The dependent variable was the child's articulation score on the *Goldman-Fristoe Test of Articulation—2* (GFTA-2) (Goldman & Fristoe, 2002), which was administered at four-month intervals. The results indicated that student performance in the telepractice condition was similar to student performance in the conventional F2F treatment condition. There was no significant difference between the two groups at the start of treatment ($p = .16$). There was no significant difference after the first four weeks in the initial treatment condition ($p = .06$). And, there was no significant difference after the second four weeks that were experienced in the alternative treatment condition ($p = .21$). The researchers collected qualitative information from the participating SLPs. This procedure was of particular interest to me as my study also focused on the providers. Perceived disadvantages of telepractice were that it was harder to collaborate with the classroom teachers and, subsequently, to relate the therapy to the classroom curriculum. On the other hand, there were perceived advantages. The SLPs reported that IEP goals were accomplished, that a free and appropriate public education (FAPE) was provided, and that telepractice was easy to do.

Family-centered Early Intervention

Studies, to date, investigating the delivery of FCEI using telepractice engaged professionals from several disciplines (i.e., speech-language pathology, occupational therapy, and physical therapy) (Baharav & Reiser, 2010: Cason, 2009; Heimerl & Rasch, 2009; Kelso, Fiechtl, Olsen, & Rule, 2009). In general, results from studies on this population corroborated one another and produced a mutual recommendation for future investigations to compare outcome measurements in F2F and telepractice conditions. My study focused on early intervention with infants and toddlers who were DHH. I did not conduct comparative outcome measures, as suggested, matching child outcomes in the F2F and telepractice conditions. My study, however, did investigate the underpinnings of FCEI provider behaviors. Several of the studies reported here (Baharav & Reiser, 2010, Heimerl & Rasch, 2009; Kelso et al., 2009; Olsen et al., 2012) explored the use of coaching behaviors that are a part of FCEI (Rush et al., 2003). The findings on the use of coaching behaviors in the telepractice condition were of special interest. A report on the research to date using telepractice in FCEI follows.

Family-centered early intervention with children with various disabilities. A study by Baharav and Reiser (2010) used a repeated-measures, single-subject design to report on client outcomes. Telepractice was used to coach parents of two children with autism. The researchers hypothesized that there would be no difference in outcomes between F2F and telepractice models. The study enrolled each family in F2F therapy, two times each week, for six weeks. For the following six weeks, each family received one session in the F2F condition and one session in the telepractice condition. Two assessment measures were used to measure child outcomes: (a) the Words and Gestures

Subtest of the *MacArthur Communicative Development Inventory* (Fenson et al., 1993) and (b) an analysis of 20-minute videotaped therapy segments. In light of the small sample, the results were encouraging. Based on videotape analyses, one child used a similar number of communicative initiations (e.g., gestures, picture-pointing, and verbalizations) per session at the end of treatment, while the other child increased the number of communicative initiations in the telepractice condition relative to the F2F sessions. Both children increased their ability to follow directions in the telepractice condition as well as the percentage of time spent in social interactions.

In 2009, Kelso et al. set out to examine the satisfaction of parents and interventionists, parental knowledge of therapeutic outcomes, cost effectiveness, time effectiveness, and the use of coaching strategies via telepractice. Four families living in rural communities participated in this study. The providers delivering the intervention included two SLPs, one occupational therapist, and one physical therapist. Results were mixed. Parent satisfaction was higher than provider satisfaction. Parents also rated the telepractice platform as more usable than the providers' ratings. There were cost savings with telepractice; therapists who delivered F2F therapy were paid for their driving time, and this cost was eliminated. The increased use of coaching strategies in the study conducted by Kelso et al. (2009) was encouraging. The therapists reported that they were less comfortable using coaching and modeling strategies than they were delivering traditional professionally-centered therapy in the F2F condition (Campbell & Sawyer, 2007; Dunst & Trivette, 1996; Dunst et al., 2002; Dunst et al., 1991; Hebbeler et al., 2008; McBride et al., 1993; Peterson et al., 2007), and this is notable due to the documented challenges in using family-centered strategies.

Cason (2009) set out to determine if early intervention services could be delivered cost effectively by occupational therapists using telepractice in rural Kentucky. The need in this community was dire; to this point, the families were receiving only one F2F treatment session each month. The providers delivered early intervention to two families for 12 consecutive weeks. This qualitative study used interviews and journaling to collect the data. The data identified three themes: (a) benefits and strengths of telepractice; (b) challenges and weaknesses; and (c) recommendations for program improvement. Results demonstrated telepractice had the potential to cost-effectively provide the intervention.

A study by Heimerl and Rasch (2009) funded by the Office for the Advancement of Telehealth explored the use of telepractice to deliver occupational therapy services in New Mexico. Children with developmental disabilities, all birth to 3 years of age, received home-based F2F services from a developmental specialist as the primary provider, while a second provider (i.e., SLP, occupational therapist, physical therapist, or psychologist) offered consultation through telepractice. The results demonstrated telepractice to be a viable service delivery method that included some persistent barriers. For instance, in spite of the theoretical support for the use of coaching strategies, many providers, sometimes unwittingly, resorted to the use of traditional professionally-centered practices (i.e., the provider determined the needs of the child) (Dunst et al., 2002; Dunst et al., 1991; Espe-Sherwindt, 2008).

Olsen et al. (2012) used telepractice in their Virtual Home Visit (VHV) Project to serve families living in three rural counties in northern Utah. The providers represented several professional disciplines including: physical therapy, occupational therapy,

speech-language pathology, child development, and special education. Coaching strategies were assumed to be standard practice. It is notable that the county Part C Coordinator initiated this study. Part C agencies are accountable for the implementation of FCEI practices. If telepractice helps meet this intent of the law, perhaps Part C agency personnel will look more favorably on adopting and funding telepractice sessions.

Olsen et al. (2012) recorded VHV sessions for evaluation purposes. During the first year of the project, the six providers' mean ratings of satisfaction were: *very satisfied* at 32%, *somewhat satisfied* at 47%, *somewhat dissatisfied* at 10%, and *very dissatisfied* at 11%. In the second year, the providers' mean satisfaction ratings improved with: 52% being *very satisfied*, 38% *somewhat satisfied*; 5%, *somewhat dissatisfied*; and 5%, *very dissatisfied*.

While family members' opinions about telepractice are not included in my study, the findings by Olsen et al. (2012) are of interest. Families completed an online survey after each VHV describing their experiences. The percentage of parents rating virtual visits as better than face-to-face sessions ranged from 8% (one parent) to 39% (five parents) over the course of the two-year project.

Olsen et al. (2012) included analyses of the recorded sessions conducted in both F2F and virtual conditions. There were some statistically significant differences that were germane to my study. Coaching strategies were used more often during VHVs than F2F visits ($p = 0.011$). The answers to my research questions may serve to corroborate the findings by Olsen et al. (2012).

Family-centered early intervention with children who are deaf or hard of hearing. While the application of telepractice to FCEI is relatively new, there is special

interest in using this service delivery platform with the population of infants and toddlers who are DHH. The use of telepractice with this population has been in response to a unique combination of factors: access to care by families living in remote or rural communities, the low incidence of hearing loss, and the lack of qualified practitioners (McCarthy, Duncan, & Leigh, 2012; Wilson & Wells, 2009). These studies with infants and toddlers with hearing loss were particularly relevant to my study; I included the same population.

Behl, Houston, Guthrie, and Guthrie (2010) conducted structured interviews to determine family satisfaction with telepractice in the Sound Beginnings Program in Utah. Sound Beginnings provides services to families who choose listening and spoken language as the desired outcome for their children (Blaiser et al., 2012). The typical telepractice session used participatory-based routines and procedures (Campbell, 2004; Campbell & Sawyer, 2007; Dunst & Trivette, 1996; Hanft et al., 2004; Klass, 2003; Mahoney et al., 1999; Muma, 1998; Wasik & Bryant, 2001). The knowledge acquired and the skills used by the parents were monitored to determine if parents successfully used recommended language facilitation techniques with their children. The interview results indicated that the providers implemented coaching techniques. The parents reported that their children were more responsive, followed their directions better, and generally improved their interactions with them. This was encouraging because FCEI practices are intended to support improved child outcomes (Dunst & Trivette, 2009a). My study investigated similar behaviors. I conducted the analyses in my study by objectively scoring digitally-recorded sessions. This technique generated more objective data than the interviews conducted in the study by Behl et al. (2010).

The study by McCarthy et al. (2010) at the Royal Institute for Deaf and Blind Children (RIDBC) in Australia measured parent satisfaction. The program adhered to the principles of a family-centered approach and focused on coaching families to be the primary facilitators of their children's listening and spoken language development (Campbell, 2004; Campbell & Sawyer, 2007; Dunst et al., 2002; Marturana & Woods, 2012; Rush et al., 2003; Woods et al., 2011). A team of highly trained and experienced teachers of the deaf and speech-language pathologists implemented the therapy. The parents and providers reported benefits from telepractice. Parents reported that they acquired skills more rapidly through telepractice than in a traditional F2F model. The role of the provider was defined, in part, by limited physical access to the child. This made it difficult, if not impossible, for the provider to directly engage in activities with the child. The provider had to "regard the parents as the primary participants" (McCarthy et al., 2010, p. S56). It seemed that telepractice, indeed, supported the use of family-centered practices. The design of my study was influenced by the FCEI studies with children who were DHH discussed here. The study by McCarthy et al. (2010) was the most prominent among them.

CHAPTER III

METHODOLOGY

The *Individuals with Disabilities Education Act* (IDEA, 1990, 1997, 2004) assures children and youth with disabilities and their family members receive appropriate intervention. A particular type of service is offered to very young children from the time of diagnosis until their third birthday; these services are addressed in Part C of IDEA and are referred to as family-centered early intervention (FCEI). These early intervention practices include family members in collaborative decision-making, in goal setting, and in the treatment of their children (Hanft, 1988). Researchers and practitioners include these undertakings in a family-centered early intervention model: (a) a child's parents are actively involved in the intervention; (b) a family's needs and desires determine service delivery; (c) professionals are agents of family members; (d) professionals intervene in ways that maximally promote family members' roles in decision-making; and (e) professionals work to identify and enhance each family member's capabilities and competencies (Brewer et al., 1989; Dunst, 2006; Dunst et al., 2002; Dunst et al., 1991; McBride et al., 1993; Powell, 1996; Trivette & Dunst, 2006).

A body of evidence indicates that many children who are supposed to receive FCEI services according to legislative initiatives (IDEA, 1990, 1997, 2004) and prevailing policies (Bricker & Widerstrom, 1996; Chandler et al., 2012; NAEYC, 2009; Sandall et al., 2005; Winton & McCollum, 2008) actually do not (Campbell et al., 2009;

Colyvas et al., 2010; Crais et al., 2006; Dunst et al., 1991; Fleming et al., 2011; Sheridan et al., 2009). This issue—the lack of compliance with the delivery of FCEI—was the motivation for my study. I investigated the use of a different service delivery platform, telepractice, to determine if it promoted the use of FCEI provider behaviors.

Telepractice connects a family in one location with a professional working in another community that can be hours from the family's home. The professional is expected to have the requisite knowledge and skills to implement therapeutic strategies that are not available where the client lives. I studied the attributes of providers who were delivering FCEI and their use of FCEI behaviors when intervention took place in the telepractice condition.

While promoting the use of FCEI provider behaviors was not the intent of telepractice, per se, I was interested in investigating the potential of telepractice to enhance providers' use of these behaviors. Advancement of the use of FCEI strategies has been the focus of my clinical work to date. My interest in telepractice is more recent. In 2010, I was the principal investigator in a multi-site grant funded by the Colorado Clinical and Translational Sciences Institute (CCTSI) to investigate the delivery of FCEI to infants and toddlers who were DHH via telepractice (Stredler-Brown, 2012). During the one-year duration of the grant, many people joined in the formation of an academic-community partnership to investigate the delivery of early intervention services using telepractice. Based on this experience, I decided an investigation of telepractice was timely and desirable. I chose one disability group for this study. I was interested in the application of FCEI practices with children who were DHH and the parents of these children.

Study Purposes

This was an exploratory study. I had two purposes. Statistical analyses were designed to investigate relationships among independent variables (IV), any relationships among dependent variables (DV), and any relationships among dependent and independent variables. The first purpose was to examine the potential relationships between provider attributes (the IV) and the use of FCEI provider behaviors (the DV) by these professionals. Descriptive statistics were used along with Fisher's Exact Test to investigate these relationships. Fisher's Exact Test was used to account for small expected frequencies (Huck, 2009). These results are described later in this chapter and, in detail, in Chapter IV. When there was a relationship, the strength of the relationship was evaluated. A liberal value of significance was used to identify results that approached significance. There was a thoughtful rationale for this decision; this was an exploratory analysis of the variables, and I did not want to miss potential relationships that could be considered in future studies. In addition, a Generalized Linear Model (GLM), a type of log-linear regression, was applied to the data. GLM was used to investigate any log-linear relationships between the dependent variables (i.e., provider behaviors) and the predictor variables (i.e., provider attributes) (Agresti, 1996; Cameron & Trivedi, 1998; Huck, 2009; Tang, He, & Tu, 2012).

I anticipated that the results of my study could have some practical implications. The results could influence: (a) the instructional content in pre-service training programs (Campbell & Coletti, 2013; Campbell et al., 2009; Colyvas et al., 2010; Crais et al., 2006; Fleming et al., 2011; Sheridan et al., 2009); (b) the topics introduced in in-service professional development trainings; (c) hiring practices in early intervention programs;

and (d) supervision of early intervention providers. The findings, some of which were statistically significant, while others were approaching significance, are discussed in detail in Chapter V.

The second purpose was to examine the frequency with which specific FCEI provider behaviors were used in telepractice and to report these data in the context of the use of the same behaviors in F2F therapy. I collected and examined information about the use of four specific provider behaviors in the telepractice condition: (a) observation (OB); (b) direct instruction (DI); (c) parent practice with feedback (PPF); and (d) child behavior with provider feedback (CBF). My review of the literature identified several studies that systematically investigated providers' use of the same behaviors in the F2F condition (Campbell & Coletti, 2013; Campbell & Sawyer, 2007; Fleming et al., 2011; McBride & Peterson, 1997; Peterson et al., 2007; Ridgley & Snyder, 2010). In Chapter IV, I describe the frequency with which these behaviors were used in telepractice in my study. And, I describe the frequency with which these behaviors were reported in the F2F condition in the published research. In Chapter V, I discuss any differences in the occurring frequencies in the two different conditions (i.e., F2F and telepractice).

Research Questions and Study Hypotheses

I had three research questions.

Q1 Was there a relationship between provider attributes (IV) and FCEI provider behaviors (DV)?

Q2 What was the nature of any statistically significant relationship between provider attributes and FCEI provider behaviors?

Q3 How often did the FCEI provider behaviors occur in the telepractice condition in contrast to the frequency of each behavior as it occurred in the F2F condition reported in the literature?

I will discuss the research questions in the context of the alternative hypotheses.

H1 Provider attributes and provider behaviors were related in the population.

H2 There were associations among provider attributes and provider behaviors in the population.

H3 Family-centered early intervention (FCEI) provider behaviors occurred more frequently in the telepractice condition.

Research Questions 1 and 2

I investigated any relationships among provider attributes (IV) and FCEI provider behaviors (DV). When there were statistically significant relationships, I explored the strength of the associations. *Cramer's V* was used as a measure of the strength of associations based on the results of the Fisher's Exact Test. With these data, I made inferences about the relationships. For instance, providers' experience using FCEI, measured in years, was positively correlated with the use of three provider behaviors (i.e., DI, PPF, and CBF). This finding has implications in pre-service training and professional development programs; experienced providers could be engaged in the training of less-experienced providers. This implication and several others is discussed in more detail in Chapter V.

Research Question 3

There is a body of evidence that reports on the percentage of 30-second intervals in which specific FCEI provider behaviors occur during a treatment session. I viewed the 16 video recordings I collected in their entirety and documented the occurrence of each of the four provider behaviors I selected. My coding also scored 30-second intervals. I used the same measurement that was used in the literature—percentage of intervals—as my unit of measurement.

I did use one strategy when I coded the videos that differed from the procedure documented in the literature (Campbell & Sawyer, 2007, 2009; Colyvas et al., 2010; McBride & Peterson, 1997; Peterson et al., 2007). In the literature (Campbell & Sawyer, 2007, 2009; McBride & Peterson, 1997; Peterson et al., 2007), only one provider behavior—the most predominant one—was identified in each 30-second interval. Alternatively, I noted when any and all of the four provider behaviors occurred. Behaviors were ranked according to the frequency with which they occurred in each 30-second interval.

The data in the literature accounted for services conducted only in the face-to-face (F2F) condition. My data identified the percentage of time the same, or similar, FCEI provider behaviors occurred in the telepractice condition. I contrasted the use of four provider behaviors in the F2F condition with the use of these same behaviors in the telepractice condition. These comparisons were always based on the predominant behavior occurring in any 30-second interval in both conditions. The percentages were higher in the telepractice condition for OB, PPF, and CBF. These data and the implications are described in Chapters IV and V.

I also collected percentages of occurrence of the four provider behaviors when they occurred in *any* position in each 30-second interval. I found that the percentage of occurrence was even higher when *all* FCEI behaviors were counted. This finding will be discussed in detail in Chapter V.

Population of Interest and Data Sources

Sixteen providers comprised the participant population in my study; all delivered FCEI in the telepractice condition. The recipients of the intervention were parents of children 36 months or younger. All the children were DHH.

Sample Size

Eight recent studies investigated the use of FCEI provider behaviors in the F2F condition (Campbell & Coletti, 2013; Campbell & Sawyer, 2007; Colyvas et al., 2010; Fleming et al., 2011; Friedman et al., 2012; McBride & Peterson, 1997; Peterson et al., 2007; Ridgley & Snyder, 2010). The number of providers in these studies ranged from 15 to 96 (*Mdn* = 40.5). Providers were the unit of analysis in my study; therefore, I sought to obtain as many providers as possible. The process used to recruit participants and the associated obstacles are described here.

At the start of my study, I was aware of nine sites in the United States that were providing FCEI via telepractice to infants and toddlers who were DHH. Some of these programs had only one provider delivering telepractice sessions. Other programs had at least two providers. I planned to recruit a minimum of 10 participants and as many as 20. After six months of data collection and many insights into the availability of digital recordings, I obtained 16 participants. The insights I gained about the use of telepractice and the digital recording of telepractice sessions are discussed in Chapter V.

In order to obtain videos from 16 providers, I first contacted directors of FCEI programs in the United States and Canada who were known to deliver FCEI via telepractice. My initial contacts were with nine sites of interest located in nine different states. My initial contact with the directors of these programs was made either in person

(n = 1) or through e-mail (n = 8). At that time, I shared the overarching intent of my study. I was careful not to disclose specific details about my hypothesis, less I prejudice potential participants. For instance, I did not discuss the provider behaviors I was studying. I provided additional oral and written information upon request to directors in seven agencies; the coordinator of one agency sent an e-mail clearly denying interest in my study, while the director of another program reported that FCEI sessions were no longer being provided via telepractice. I sent follow-up information, via e-mail, to professionals in two agencies. Follow-up communication was conducted by phone with professionals in five agencies.

I quickly realized that it would be advantageous to contact more than nine agencies in order to obtain an adequate number of participants in a relatively expeditious time frame. I ultimately contacted program directors, coordinators, and leads in 24 different clinical programs. This, indeed, facilitated recruitment of 16 participants and may have fostered a more representative sample of providers nationwide. The issues encountered during the recruitment process are described in detail in Chapter V.

Family-centered Early Intervention Providers

Eligibility criteria for the providers were straightforward: (a) participants provided FCEI to infants and toddlers who were DHH; (b) sessions were conducted in the telepractice condition; and (c) the telepractice session was digitally-recorded. The program directors and coordinators acknowledged the intention to use FCEI strategies when children were under 36 months of age. I gave providers an option to share recorded

sessions that had been conducted in the past and stored. However, no participants elected this option. All sessions were recorded for the purpose of my study.

Both the provider and the parent were captured on each recording. Occasionally, the child, though present, was out of view. This did not present a problem in the analysis of the video recordings since my study collected data related only to *provider* behaviors. Furthermore, all of the provider behaviors I selected related to the provider-parent relationship.

Recipients of the Intervention

The provider, the child, and at least one parent were present during each digitally-recorded session. Consent was collected from each parent in order for the digitally-recorded session to be used in my study. Consent was also obtained from the providers. Each program's director signed an agency permission form.

The characteristics of the children were not critical to this study because I was investigating only provider behaviors. In fact, I shared these criteria only with the program directors. I did not ask for a profile of each child's hearing loss. All of the children included in the videos met the eligibility requirements of the study. All of the children were DHH. Hearing loss was bilateral and varied in degree. Children had any type of hearing loss (i.e., sensorineural, mixed, or auditory neuropathy) and any configuration of hearing loss (i.e., flat, sloping, cookie bite, or reverse slope). All children were 36 months of age or younger when the session occurred. English was the primary language spoken in the family's home.

There were no other eligibility requirements for the children. Assent was not necessary for two reasons. One was the very young age of the children. Second, because

all of the sessions were digitally-recorded, there was no need to consider the behaviors of the child during the session in order to determine assent.

Variables of Interest

A review of the literature provided access to several studies that systematically studied providers' use of FCEI behaviors (Campbell & Coletti, 2013; Campbell & Sawyer, 2007; Fleming et al., 2011; McBride & Peterson, 1997; Peterson et al., 2007; Ridgley & Snyder, 2010). I drew heavily from this body of research as I selected my independent and dependent variables of interest.

Provider Characteristics

There are 13 variables describing provider attributes in the literature. I deliberated including each variable. In making my selections, I considered: (a) how often the provider attribute was included in other studies; (b) the significance of an attribute when this information was published; (c) my interest in the behavior, based on my experience; and (d) the need to limit the number of variables in my study. I reviewed eight studies (Campbell & Coletti, 2013; Campbell & Sawyer, 2007; Colyvas et al., 2010; Fleming et al., 2011; Friedman et al., 2012; McBride & Peterson, 1997; Peterson et al., 2007; Ridgley & Snyder, 2010). I selected seven independent variables. A copy of the provider questionnaire investigating provider attributes is in Appendix A.

Chosen attributes. I selected seven independent variables describing provider attributes. These were: (a) the education level of the providers; (b) certification as an AVT or AVEd; (c) the pre-service training discipline of the providers; (d) the amount of time, in number of years, each provider has worked in early intervention; (e) the number of children, birth to 36 months, seen by the provider during his or her career; (f) the

number of sessions conducted with children *of any age* using telepractice; and (g) the number of sessions conducted with infants and toddlers, *birth to 36 months*, employing telepractice.

In an effort to establish statistical integrity, I combined responses into fewer categories before conducting my data analyses. This issue addresses my relatively small sample size. As described for each independent variable, certain attributes of providers were either not observed or rarely observed. I combined categories, as described below, to allow my statistical approaches to provide useful information.

Education level. I was interested in the education level of the providers. This variable was reported in five studies (Campbell & Coletti, 2013; Campbell & Sawyer, 2007; McBride & Peterson, 1997; Peterson et al., 2007; Ridgley & Snyder, 2010). These studies included these specific traits: (a) high school degree; (b) AA degree; (c) BA (or equivalent) degree; (d) MA (or equivalent) degree; (e) Au.D. degree; (f) Ed.D. degree; and/or (g) Ph.D. degree. I included all seven options in my survey.

I wanted to explore the impact of education on the use of participatory-based behaviors. Fifteen providers earned a Master's degree; one provider earned a Ph.D. Because there was little diversity in the responses to this survey question, the data were not analyzed.

Additional certification. I asked if the provider had an additional certificate (i.e., LSLS-Cert AVT or LSLS-Cert AVEd). The LSLS-Cert AVT and LSLS-Cert AVEd are awarded by the AG Bell Academy for Listening and Spoken Language (LSLS) (AG Bell, 2014); qualified professionals must meet rigorous academic, professional, post-graduate education and mentoring requirements and pass the LSLS certification exam. There are

nine LSLS core competencies. One domain focuses on parent guidance, education, and support. This domain relates directly to instruction delivering FCEI. I wanted to investigate the impact the training toward this certification could have on providers' use of FCEI behaviors. The survey question allowed respondents to identify other types of certification.

Six providers (37.5%) were certified as AVTs, three (18.75%) held a certificate as an AVEd, one person (6.25%) had state certification in early childhood, and six providers (37.5%) did not have an additional certificate other than the one required by the professional disciplines' certifying body (i.e., a Certificate of Clinical Competence for members of the American Speech, Language, Hearing Association).

I chose to make this a two-category variable; having only two categories supported statistical integrity of the data. Furthermore, certification as a Listening and Spoken Language Specialist (LSLS) is a highly coveted and well-advertised accomplishment. The data analyses were conducted based on having certification either as an AVT or AVEd or not having this type of certification. No significant relationships were found between having certification as a LSLS and not having this certificate.

Pre-service training discipline. Six studies collected information about providers' pre-service training programs (Campbell & Coletti, 2013; Campbell & Sawyer, 2007; Fleming et al., 2011; Friedman et al., 2012; McBride & Peterson, 1997; Ridgley & Snyder, 2010). These six studies included children with all types of disabilities. In the literature, provider pre-service training included up to five different disciplines (i.e., early childhood education, early childhood special education, occupational therapy, physical therapy, and speech-language pathology).

The discipline in which the participants obtained their pre-service training was of interest in my study. Providers working with infants and toddlers who are DHH are a hybrid group and generally acquire pre-service training in one of several types of programs (i.e., teacher of the DHH, speech-language pathology, audiology, early childhood special education, and early childhood) (Arehart et al., 1998; Stredler-Brown & Arehart, 2000). There is a difference in the type and amount of instruction in FCEI offered by the different pre-service training disciplines. I was interested in seeing if the different types of training would impact the use of FCEI provider behaviors.

There were two ways to delineate this variable. One was to inquire about the discipline that awarded the provider's highest degree. Ridgley and Snyder (2010) used this procedure. A more descriptive investigation would identify all pre-service training disciplines for each provider. Three studies identified multiple categories and reserved "other" for any options that did not fit the predesigned classifications (Campbell & Coletti, 2013; Campbell & Sawyer, 2007; Fleming et al., 2011). I preferred the second approach because I thought it would be valuable to identify any and all pre-service training. I intended to investigate if certain combinations of pre-service training degrees promoted the use of more FCEI provider behaviors. I asked each provider to identify each discipline that conferred a degree at the bachelor's, master's, and/or doctoral level. I identified five different pre-service training disciplines: (a) audiology (n = 1; 6.25%); (b) early childhood (0%); (c) early childhood special education (0%); (d) speech-language pathology (n = 9; 68.75%); and/or (e) teacher of the deaf/hard of hearing (n = 6; 37.5%). As I conducted the data analyses, it became clear that I needed to create fewer categories to preserve statistical integrity. I chose to analyze only the highest degree

obtained by each provider. Providers' highest degree was easily categorized into two groups: (a) communication disorders (n = 10; 62.5%), and (b) education of the deaf/hard of hearing (n = 6; 37.5%). It is notable that I included those providers with the highest degree in speech-language pathology (n = 9) and the one provider whose highest degree was in audiology. While there are differences in the training of speech-language pathologists and audiologists, these fields are closely aligned. Having a third category with only one audiologist in it would have rendered the analyses less robust. Even with the reduction to only two categories, no significant relationships were found based on pre-service training and the use of FCEI provider behaviors.

Years working in early intervention. Seven studies collected information about the amount of providers' experience (Campbell & Coletti, 2013; Campbell & Sawyer, 2007; Colyvas et al., 2010; Fleming et al., 2011; Friedman et al., 2012; Peterson et al., 2007; Ridgley & Snyder, 2010). Six studies explicitly asked about the number of years a provider worked in early intervention (Campbell & Coletti, 2013; Campbell & Sawyer, 2007; Colyvas et al., 2010; Fleming et al., 2011; Friedman et al., 2012; Ridgley & Snyder, 2010). I was interested in studying the amount of experience in early intervention, measured in number of years, of the participants in my study. In my clinical work, I have observed strong associations among years of experience and use of different behaviors. Furthermore, Ridgley and Snyder (2010) studied this characteristic and found a statistically significant relationship between years providing early intervention and the use of FCEI provider behaviors.

I asked each provider to identify the number of years she delivered family-centered early intervention (FCEI). The response options ranged from 1 year or less to

32 or more years, which accounted for 22 possible responses. Providers' actual experience ranged from 0-1 years to 24-26 years; the answers populated 12 of the potential 22 categories. I thoughtfully chose to group this variable into two categories: (a) 0-9 years (n = 7; 43.75%); and (b) 10 or more years (n = 9; 56.25%). I had several justifications for this decision. First, I wanted to keep the number of providers in each category as large as possible in order to maintain statistical integrity. And, maintaining only two categories for each independent variable added consistency to the analyses. The division was made based on less (0-9 years) or more (10+ years) experience. Seven providers (43.75%) fell into the "less experienced" category; nine providers (56.25%) were in the "more experienced" category. There was a significant or marginally significant relationship between experience in years and the use of two FCEI behaviors (i.e., direct instruction and child behavior with provider feedback).

Number of children served. Campbell and Coletti (2013) collected information on the number of clients the professionals in their study served. I collected information from each participant, identifying the total number of children, birth to 36 months of age, each provider has had on her caseload. My starting point for counting number of children on a provider's caseload was when the participant started working as a professional. Children who were seen by the provider during internships and practica as a part of pre-service training were not included. This seemed to be an important variable because, from my perspective, experience can contribute to the use of FCEI provider behaviors. The number of children seen during the providers' careers was delineated in increments of 5 (up to 20 children) and in increments of 10 thereafter. There were seven categories.

The first option on the survey was identified as fewer than 5 children; the last option for this question was more than 40 children.

I divided the providers' responses into two dichotomous categories that identified experience as less or more. The options on the survey were divided into categories based on 5-year increments and 10-year increments. I used these two differing parameters to create my categories of less or more experience. Five providers (31.25%) worked with fewer than 5 children and up to 20 children. Eleven providers (68.75%) worked with 21 to greater than 40 children. Of those providers who had seen more children, 10 out of 11 had seen more than 40 children; more experience seemed to be analogous with *a lot* more experience.

The findings did not show significance for any relationships between experience with children and FCEI provider behaviors. Even a liberal statistical approach to identifying trends (i.e., $p = .20$) did not support significance. These results are presented in more detail in Chapter IV.

Experience with telepractice with children of all ages. I developed two questions probing providers' experience using telepractice. One question asked the provider to estimate the number of sessions conducted, to date, with children *of any age* using telepractice. This question also gave providers a choice of seven options ranging from fewer than 5 children to more than 40 children. Providers chose the appropriate number of sessions from these seven options. Providers' responses populated four categories. I created two categories based on less or more experience using telepractice with children of all ages. Because so many providers had seen more than 40 children using telepractice, this category could stand alone. Twelve providers (75%) had used

telepractice with more than 40 children of all ages; four providers (25%) were considered less experienced.

Experience with telepractice with children birth to 36 months of age. The second question about telepractice asked the provider to estimate the number of telepractice sessions conducted, to date, with only *infants and toddlers*. This question gave providers the same choice of seven options, ranging from fewer than 5 children to more than 40 children. Providers checked the number of sessions from these seven options. Providers' responses populated five categories. I created the same two categories as the previous question based on less or more experience using telepractice with children of all ages: seven providers (43.75%) were less-experienced (<40 sessions); nine providers (56.25%) used telepractice with more than 40 children birth to 36 months of age.

Telepractice is a relatively new platform. I wanted to investigate any associations between experience with telepractice and the delivery of FCEI. Experience with telepractice with children of all ages was not significantly related to the use of any of the four provider behaviors. Experience with telepractice, specifically with infants and toddlers under 3 years of age, was marginally related to child behavior with provider feedback (CBF). All of these results are described in detail in Chapter IV. The implications of these findings are discussed in Chapter V.

Omitted attributes. Based on the small sample size in my study, it was important to limit the number of independent variables. I chose not to include these typically occurring provider traits.

Gender. Information about gender was collected in six studies (Campbell & Sawyer, 2007; Colyvas et al., 2010; Fleming et al., 2011; McBride & Peterson, 1997; Peterson et al., 2007; Ridgley & Snyder, 2010). At least 90% of the providers in each study were female. This characteristic was of little interest because females continue to dominate the field of early intervention. The information about gender was reported, but it was not analyzed in the aforementioned studies. Not surprisingly, all 16 providers in my study were female.

Race and ethnicity. Race and ethnicity were included in seven studies (Campbell & Coletti, 2013; Campbell & Sawyer, 2007; Colyvas et al., 2010; Fleming et al., 2011; McBride & Peterson, 1997; Peterson et al., 2007; Ridgley & Snyder, 2010). Caucasians dominated the work force; the percentage of providers who were Caucasian ranged from 72%-100%. No analyses were conducted on the implications of race in the literature.

Age. The age of the providers was collected in six studies (Campbell & Sawyer, 2007; Colyvas et al., 2010; Fleming et al., 2011; McBride & Peterson, 1997; Peterson et al., 2007; Ridgley & Snyder, 2010). This variable was not included in any analyses in the cited literature. I did not include this variable. Rather, I was more interested in the amount of experience of each provider. My own work as an administrator suggested that years of experience in each provider's discipline and the number of clients each provider has seen are more practical indices of providers' skills.

Employment status. Employment status was divided into three categories in two studies: (a) contracted; (b) part-time employee; and (c) full-time employee (Campbell & Coletti, 2013; Fleming et al., 2011). The employment status was not analyzed in either study. This criterion held interest for me as a potential indicator of experience. However,

I chose other variables (i.e., years of experience in early intervention and number of children seen) to measure experience.

Number of years working in the discipline. Three studies collected information describing the number of years the providers worked in their professional discipline (Campbell & Coletti, 2013; Colyvas et al., 2010; Fleming et al., 2011). I chose not to investigate this attribute in my study. I was more interested in the number of years providers have worked in early intervention.

Family-centered Early Intervention Provider Behaviors

I coded recorded videos and systematically identified four specific provider behaviors. I selected four provider behaviors from an extensive list of more than 30 possible behaviors cited in the literature (Basu et al., 2010; Campbell & Coletti, 2013; Campbell & Sawyer, 2007; Colyvas et al., 2010; Fleming et al., 2011; Friedman et al., 2012; McBride & Peterson, 1997; Peterson et al., 2007; Woods et al., 2011). The four behaviors I included were: (a) provider *observes* parent-child interaction (OB); (b) provider offers *direct instruction* to the caregiver (DI); (c) provider offers *feedback* to the parent as the *parent practices* the behavior with the child (PPF); and (d) provider offers *feedback* to the parent about the *child's* actions or the child's *behavior* while the child interacts with the parent (CBF).

Chosen behaviors. I considered many issues as I selected these four dependent variables. All chosen provider behaviors fit these parameters of FCEI practice: (a) the behaviors are participatory-based; (b) the behaviors are repeatedly documented in the

literature; (c) the behaviors are easily measured; and (d) my experience corroborates the importance of these behaviors to support parent and child outcomes.

Observation (OB). According to Friedman et al. (2012), an operational definition of observation is when "the caregiver interacts with the child while the early interventionist observes without offering any feedback or suggestions" (p. 68). Other researchers corroborate this definition (Campbell & Sawyer, 2007; McBride & Peterson, 1997; Peterson et al., 2007). The provider is primarily watching; verbal input (i.e., feedback and suggestions) is not offered (Colyvas et al., 2010).

Observation is integral to the decision-making process for both the provider and the parent (Friedman et al., 2012). The provider actively watches typical interactions between the parent and child during a routine. The provider notices the parent's use of a strategy, the child's participation in the activity, and the dynamics of the dyadic interaction. While observing, the provider collects information that can be used to develop or revise an intervention plan.

Woods et al. (2011) discussed the value of observation. Because the provider is not actively engaged in the activity, the parent becomes the child's primary communication partner. The provider can obtain an immediate update on the child's ability to interact with the parent and assess the quality of the interaction.

Observation was used frequently in my study. The extent to which observation was used, its use in telepractice in contrast to its use in F2F therapy, and the implications of my findings are discussed in Chapters IV and V.

Direct instruction (DI). Woods et al. (2011) operationally define direct instruction as "specific, outcome-directed instruction by a competent teacher on a concept

or skill to increase independent performance of the learner" (p. 386). Campbell and Sawyer (2009) stated that the role of the early intervention provider is to train, teach, or coach the parents and not work directly with the child. Friedman et al. (2012) explain that the provider intentionally scaffolds the caregiver's knowledge or capacity for skill mastery by providing print, verbal, and/or video information on how to implement a specific strategy. Based on adult learning theory, direct instruction is used to change a behavior, convey knowledge, and teach skills (Knowles, Holton, & Swanson, 2005). Woods et al. (2011) stated that parents are unlikely to have the expertise or experience to identify appropriate strategies to support their child's learning when the child is DHH. Direct instruction addresses this challenge by providing a detailed description about a strategy and its importance. Direct instruction can increase a parent's competence and confidence using particular intervention strategies (Woods et al., 2011) by helping the parent to understand why a strategy is important and ways in which its use can augment the child's development (Campbell, 2004; Friedman et al., 2012). The provider shares information intentionally and systematically to promote parental understanding and skill mastery (Colyvas et al., 2010). Having this knowledge can increase the parent's consistent use of the strategy. As a result of direct instruction, parents can practice a strategy during the session before being expected to use it independently between service visits (Colyvas et al., 2010).

I included this behavior because direct instruction seemed to be especially important in the telepractice condition. In telepractice, the provider is working remotely and cannot demonstrate a technique as easily. To account for this, a more in-depth description of the strategies being taught may be warranted.

While explicit teaching has been shown to be an effective and efficient approach, it is not used regularly in F2F early intervention sessions (Campbell & Sawyer, 2007; Peterson et al., 2007; Wilcox et al., 2010). My findings indicated that providers used direct instruction in the telepractice condition in similar amounts to its occurrence in F2F therapy.

Parent practice with feedback (PPF). Friedman et al. (2012) operationally defined parent practice with feedback when "the caregiver is the primary partner with the child, and the provider offers encouragement and feedback" (p. 70). The provider offers prompts, recommendations, reinforcement, and/or encouraging comments to the parent specifically about the parent's behaviors (Basu et al., 2010; Campbell & Coletti, 2013; Colyvas et al., 2010; Woods et al., 2011). This behavior is based on adult learning theory (Lave & Wenger, 1991, as cited in Freidman et al., 2012); the provider guides the parent while the parent is engaged with the child. The feedback supports mastery of a strategy or technique that was taught to the parent (Donovan et al., 1999, as cited in Woods et al., 2011). Feedback can increase the parent's competence and confidence by providing opportunities for practice with support from the provider that is strategically matched to the parent's performance (Friedman et al., 2012).

Feedback is provided within the context of the parent-child interaction and specifically addresses the strategy being used (Woods et al., 2011). The feedback helps promote the parent's understanding of the strategy (Friedman et al., 2012). Furthermore, Friedman et al. (2012) reported that this behavior helps maintain the child's engagement in the activity. This is beneficial as it provides opportunities for the child to practice a

new skill. The provider's suggestions and prompts may describe what is working and what can be done differently.

While there is value in the use of this FCEI behavior, it is not used very frequently in F2F therapy (Colyvas et al., 2010; McBride & Peterson, 1997; Peterson et al., 2007). This behavior was used more frequently in the videos I coded, which were all conducted in the telepractice condition. These findings are discussed in more detail in Chapters IV and V.

Child behavior with provider feedback (CBF). Basu et al. (2010) offer an operational definition describing the provider's feedback as it relates to the child's behavior. It reads, "Share information about the child's actions or developmental sequence or about behaviors related to child's goals" (p. 147). The parent is interacting with the child, and the provider offers feedback to the parent about the *child's* behavior during the parent-child interaction (Friedman et al., 2012). This feedback may be related to the child's participation, the child's performance, and/or what went well (Friedman et al., 2012). The purpose of this technique is to help the parent see when a technique benefits the child. This, in turn, may help the parent to intentionally use the technique and to use it more frequently, which can facilitate positive child outcomes (Woods et al., 2011).

This behavior is documented in the literature for therapy conducted in the F2F condition (Colyvas et al., 2010; McBride & Peterson, 1997; Peterson et al., 2007). It occurred more frequently in the videos I coded in the telepractice condition. These results and the implications of these results are discussed in Chapters IV and V.

Omitted behaviors. There are several reasons some of the provider behaviors studied in the literature were excluded from my study. Many of the omitted provider behaviors included in the literature (Basu et al., 2010; Campbell & Coletti, 2013; Campbell & Sawyer, 2007; Colyvas et al., 2010; Fleming et al., 2011; Friedman et al., 2012; McBride & Peterson, 1997; Peterson et al., 2007; Woods et al., 2011) did not fit into the four inclusive categories in my study. Some omitted provider behaviors were not applicable to telepractice. Other omitted provider behaviors were not participatory-based. Some omitted behaviors were subsumed within the four categories I selected. I have identified the specific behaviors I excluded from my study.

Behaviors are not participatory-based. The behaviors described in this section, while acceptable components of FCEI, are not participatory-based. For instance, some behaviors exemplify relational strategies: (a) listens (Basu et al., 2010; McBride & Peterson, 1997); (b) reflective listening (Colyvas et al., 2010; Woods et al., 2011); and (c) reflective suggestion (Basu et al., 2010; Woods et al., 2011).

There are some behaviors that occur during a typical session that are not FCEI behaviors. They are frequently used behaviors, but they did not meet the intent of my study. These behaviors included: (a) transition between activities (McBride & Peterson, 1997); (b) general conversation (Campbell & Sawyer, 2007; Colyvas et al., 2010; Friedman et al., 2012; McBride & Peterson, 1997); (c) no interaction (Campbell & Sawyer, 2007); (d) other discussion (Campbell & Sawyer, 2007); and (e) other content (Campbell & Sawyer, 2007).

Behaviors cannot be accomplished in telepractice. These FCEI provider behaviors are accepted practice. However, I thought they could not be readily

implemented in the telepractice condition: (a) direct teaching with child (Basu et al., 2010; Campbell & Sawyer, 2007; Colyvas et al., 2010; Friedman et al., 2012; McBride & Peterson, 1997; Woods et al., 2011); (b) modeling for parent with narrative (Campbell & Sawyer, 2007; Colyvas et al., 2010; McBride & Peterson, 1997; Woods et al., 2011); (c) facilitating child's play (McBride & Peterson, 1997); (d) provider joins in the play activity (Campbell & Sawyer, 2007); and (e) provider joins parent in interaction with child (no explanation or feedback) (Basu et al., 2010; Campbell & Sawyer, 2007; Colyvas et al., 2010; Friedman et al., 2012).

General behaviors. Some FCEI provider behaviors in the literature are global definitions that, in some cases, include the specific behaviors I have chosen. For instance, coaching and support for the parent is a behavior mentioned by McBride and Peterson (1997) and Campbell and Sawyer (2007). Two of the behaviors I included in my study (i.e., feedback to parent about the parent's behavior and feedback to the parent about the child's actions) fall within this broader definition. The same can be said about discussion related to the child's developmental progress (Basu et al., 2010; Campbell & Sawyer, 2007; Friedman et al., 2012) and commenting (Woods et al., 2011). Two behaviors, sensitive direction and sensitive facilitation (Campbell & Sawyer, 2007), carry broad definitions; two of my chosen provider behaviors (i.e., feedback to parent about the parent's behavior and feedback to parent about the child's actions) addressed this topic. Woods et al. (2011) mention a provider's delivery of a color commentary. When using this strategy, the therapist provides an on-the-spot commentary by giving immediate feedback to the parent during a teachable moment (Stredler-Brown, 2011b). This

behavior was included in my third independent variable—provider offers feedback to the parent about the parent's behavior.

Behaviors omitted to limit the number of DVs. There were several participatory-based behaviors that were of interest to my study and, based on my experience, could be beneficial. It was a difficult decision to omit the following behaviors. By limiting the number of provider behaviors, I hoped to obtain large frequency counts for easily-distinguished behaviors. I selected four behaviors that I suspected would occur most often in the telepractice condition. The provider behaviors not included as dependent variables in my study were: (a) questioning (Woods et al., 2011); (b) prompting (Woods et al., 2011); (c) problem solving (Campbell & Sawyer, 2007; Friedman et al., 2012; Woods et al., 2011); (d) provider expands the caregiver's idea (Woods et al., 2011); and (e) provider makes suggestions of things to do outside of the intervention session (Basu et al., 2010). After reviewing all of the videos in my study, these behaviors did not occur with any regularity. Alternatively, there were three behaviors that did occur frequently: (a) modeling or facilitating an activity; (b) provider's active participation in a three-way (triadic) interaction (Peterson et al., 2007); and (c) conversation between provider and parent. As discussed in Chapter V, in future studies, I would give strong consideration to including these provider behaviors in any coding scheme measuring FCEI provider behaviors.

Data Collection Procedures

McBride and Peterson (1997) stated that "observational methods may be the best strategy for describing intervention practices actually being implemented during home visits and for documenting the fidelity of an intended intervention occurring in the home"

(p. 213). I measured provider behaviors through observational methods. I developed a measurement instrument based on the literature (Basu et al., 2010; Campbell & Coletti, 2013; Campbell & Sawyer, 2007; Colyvas et al., 2010; Fleming et al., 2011; Friedman et al., 2012; McBride & Peterson, 1997; Peterson et al., 2007; Woods et al., 2011). A copy of the instrument is in Appendix B.

Measurement Characteristics

Length of session. The length of the 16 videos varied from 29.5 minutes to 70 minutes. Three videos were closer to one-half hour in length at 29.5, 32, and 33 minutes. Two videos were closer to 45 minutes in length at 42.5 and 45.5 minutes. The remaining 11 videos ranged in length from 50.5 to 70 minutes.

Each digitally-recorded session was observed in its entirety up to a maximum length of 60 minutes, whichever came first. When videos were longer than 60 minutes, only 60 minutes of the session were coded. This procedure has been documented in the literature (McBride & Peterson, 1997; Peterson et al., 2007).

Coding intervals. The videos were analyzed in 30-second intervals; this is a customary procedure in the literature (Campbell & Sawyer, 2007; Colyvas et al., 2010; Friedman et al., 2012; McBride & Peterson, 1997). It is also customary, based on the literature, for only one behavior to be recorded during each 30-second interval; when there is more than one behavior in an interval, the behavior present for the longest period of time was noted (Campbell & Sawyer, 2007; McBride & Peterson, 1997). I adapted this approach; I measured *all* behaviors that occurred in each 30-second interval. I identified the behavior that occurred for the longest period of time. In addition, I identified any additional behaviors that occurred in a 30-second interval. When more

than one behavior occurred in one 30-second interval, the behaviors were ranked based on the number of seconds each behavior occurred; the most predominant behavior received a ranking of "1," and subsequent behaviors were ranked as "2," "3," or "4" to reflect the relative amount of time each behavior occurred. In my analyses, when I contrasted the use of FCEI provider behaviors in F2F and telepractice conditions, I discussed my findings in two ways: (a) comparing the predominant behavior in a 30-second interval; and (b) comparing the prevalence of all behaviors that occurred in all 30-second intervals. These results are discussed in Chapters IV and V.

Measurement Instrument

I originally intended to use a measurement instrument that was used by other researchers. The *Home Visitor Observation Form* (HVOF) (McBride & Peterson, 1997) was one likely choice because it was used most often in the published literature (Campbell & Sawyer, 2007, 2009; McBride & Peterson, 1997; Peterson et al., 2007). That said, only two of the studies used this instrument in its original form (McBride & Peterson, 1997; Peterson et al., 2007), and two studies used a modified version (Campbell & Sawyer, 2007, 2009). In making the modifications, Campbell and Sawyer (2007, 2009) altered the number of provider behaviors. In addition to the modified version of the HVOF, Campbell and Sawyer (2007, 2009) used the *Natural Environment Rating Scale* (NERS). Colyvas et al. (2010) developed the *Teaching Caregiver Scale*. Then, Basu et al. (2010) developed the *Triadic Intervention and Evaluation Rating Scale* (TIERS). It seemed to me that consensus had not been reached on a satisfactory measurement instrument. This made it difficult to select an existing measurement tool from the literature.

Another challenge was that no one existing measurement instrument suited my study. The HVOF (McBride & Peterson, 1997) included 10 behaviors; its modified version (Campbell & Sawyer, 2007, 2009) included 8. This was deemed to be too many behaviors for my small sample. The NERS (Campbell & Sawyer, 2007, 2009) included many questions about the environment in which FCEI was conducted, which was not a variable of interest in my study. The TIERS (Basu et al., 2010) scored the dynamic interactions among provider, caregiver, and child. This approach did not suit my study as I was coding only the interactions between provider and parent.

There seemed to be a trend to develop measurement instruments for particular studies. I did the same. I was discriminating in my selection of provider behaviors; choosing FCEI provider behaviors that appeared repeatedly in the aforementioned scoring protocols in the literature.

Institutional Review Board (IRB) Application

My application to the University of Northern Colorado (UNC) IRB was submitted electronically on January 21, 2014. I applied for an expedited review. This level of approval was needed because I used video recordings of young children in my study. The application was approved on February 19, 2014. One amendment was submitted to UNC's IRB on May 14, 2014; one director asked to have the name of her agency explicitly documented in the IRB. The amendment was quickly approved by UNC's IRB on May 15, 2014.

The IRB included a cover sheet, the narrative, and four related documents. These documents are in Appendices C through H and include: (a) a cover sheet (Appendix C); (b) the amended and approved narrative (Appendix D); (c) the original e-mail inviting

agency directors to participate in my study (Appendix E); (d) the agency permission form (Appendix F); (e) provider consent (Appendix G); and (f) parent consent (Appendix H). As mentioned earlier, the provider questionnaire is included in Appendix A; and the video recording coding form is included in Appendix B.

Recruitment

I first approached directors of clinical programs that were known to me to use telepractice to deliver FCEI to children who were DHH. I made an initial contact with the program directors at nine sites. I contacted one program director in person and eight more directors or program leads by e-mail. I introduced, in general terms, my interest in studying FCEI when it was delivered via telepractice to children who ranged in age from birth to 36 months. I did not mention the specific interest of my study—to study FCEI provider behaviors—as I thought this information might bias the actions of potential participants. When the program director was interested in my study, I asked her to identify providers in the agency who had provided and/or were currently offering FCEI via telepractice.

I provided additional oral and written information, upon request, to directors in seven agencies. The coordinator of one agency sent an e-mail denying interest in my study. The director of another program reported that FCEI sessions were no longer being provided via telepractice. I sent follow-up information, via e-mail, to professionals in two of the original nine agencies. Follow-up communication was conducted by phone with professionals in five agencies.

I quickly realized that it would be advantageous to contact more agencies in order to obtain an adequate number of participants. The reasons for this realization are

discussed in detail in Chapter V. I ultimately contacted program directors, coordinators, and program leads in 24 clinical programs in the United States and Canada. This decision facilitated recruitment of 16 participants.

Participants represented a convenience sample. I selected a naturally occurring group of people within the population I wanted to study (Huck, 2009). I recruited more than one provider when an agency had multiple providers delivering FCEI via telepractice. I had one provider from three different agencies, two providers from three agencies, three providers from one agency, and four providers from one agency. Programs were in different geographic regions in the United States. Data sharing regulations in Canada prevented two programs from participating. Other limitations are described in Chapter V. The eight participating agencies were located in six different states. This fostered a relatively representative sample of providers nationwide. My intention was to have as large a sample size as possible in order to detect significance in my statistical analyses.

Participants did not vary much by type of center (i.e., private, not-for-profit, state supported, or university affiliated) as all agencies were private and/or not-for-profit agencies. The implications of the type of center and any training programs within a center are discussed in Chapter V. I set out to obtain a representative sample of providers using different communication approaches (i.e., listening and spoken language, sign language, or a combination of spoken and signed language). However, all providers used the Listening and Spoken Language (LSLS) (Dickson, 2011) approach exclusively.

Providers were the unit of analysis in my study. In order to make the characteristics of the unit of analysis similar among participants, each provider submitted

one digitally-recorded session. I accepted all participants from the sites that agreed to be in my study. Each provider conducted one session with one child. Each child's mother actively participated during the entire session.

Provider Questionnaire

I developed a questionnaire, to be completed by each participant, to identify the attributes of each provider. This questionnaire is in Appendix A. The questionnaire was sent to the program directors via e-mail. Program directors gave the questionnaire to the providers in the agency. Five providers returned the questionnaires to me via e-mail. Nine participants' completed questionnaires were returned to me by the program director and/or program lead. I acknowledged receipt of the questionnaires to the person who sent them. Sometimes, I sent reminders, by e-mail, in order to secure all of the questionnaires.

Securing Digitally-recorded Sessions

The program director or program lead identified at least one provider in the agency who was conducting sessions with children who met my study criteria via telepractice. Each provider recorded one upcoming session. All recordings were made specifically for my study.

Copies of the recorded sessions were sent to me as privacy and security concerns allowed. Agency personnel chose various methods to give me access to the videos: (a) Dropbox; (b) USB flash drives; and (c) access to secured servers maintained by the agency. While I offered to travel to an agency's office to analyze videos on site, none of the program directors chose this option. All recorded sessions were logged with coded numbers to maintain anonymity of the agency and the provider. No information about

the child nor the children's mothers was obtained. To comply with IRB regulations, I did not store videos on my hard drive.

Coding Digitally-recorded Sessions

I coded all of the videos. I had experience with this task from previous projects (Georgitis & Stredler-Brown, 1987: Stredler-Brown & Yoshinaga-Itano, 1994). The length of each video was apparent on the recording. Coding commenced at the beginning of the session in order to access all FCEI provider behaviors that occurred. This procedure was used and endorsed in three studies (Campbell & Coletti, 2013; Campbell & Sawyer, 2007, 2009; Colyvas et al., 2010).

I collected frequency counts of the four FCEI provider behaviors identified as dependent variables (DVs) in my study. Videos were coded at 30-second intervals. All behaviors occurring within each 30-second interval were identified. When more than one behavior occurred in any given 30-second interval, the behaviors were identified based on incrementally longer durations. This allowed for an opportunity to recognize *all* behaviors that occurred.

Statistical Data Analyses

Data were analyzed in stages. First I addressed the first and second research questions. A different approach was used to address the third research question. I discuss the research questions in the context of the alternative hypotheses.

H1 Provider attributes and provider behaviors were related in the population.

H2 There were associations among provider attributes and provider behaviors in the population.

H3 Family-centered early intervention (FCEI) provider behaviors occurred more frequently in the telepractice condition.

Research Questions 1 and 2

The first research question asked if there was a relationship between provider attributes (IV) and FCEI provider behaviors (DV). The second research question set out to investigate the nature of any statistically significant relationships between provider attributes and FCEI provider behaviors. In order to prepare the data to be entered into SPSS (version 22.0), I created a table in Excel. Values for all independent and dependent variables were reviewed for accuracy.

Values for independent variables. I chose to cluster data into two categories for each independent variable (IV), even though the original survey had more than two categories for each question. Once I reviewed all survey results, many categories were empty. And, some categories had only one response. I made clinically appropriate distinctions in determining the two categories for each IV. The justifications for fitting all values for IVs into two categories was described earlier in this chapter under the description of each provider attribute. The categories for each IV, along with percentages, are in Table 1.

Table 1

Categories for Independent Variables

Provider Attribute	Original Number of Categories	Revised Number of Categories (%)
Certification	(1) AVT (2) AVEd (3) Other	(1) AVT or AVEd (56.25) (2) Other/None (43.75)
Highest degree	(1) Audiology (2) Early Childhood (3) Early Childhood Special Education (4) Speech-Language Pathology (5) Teacher of the Deaf/Hard of Hearing	(1) Communication Disorders (62.5) (2) Teacher of the Deaf/Hard of Hearing (37.5)
Number of years delivering FCEI	22 categories (range 0-32+)	(1) 0-9 years (43.75) (2) 10+ years (56.25)
Number of children receiving FCEI	7 categories (range <5 - > 40)	(1) <5 - 20 (31.25) (2) 21 - >40 (68.75)
Telepractice with children of any age	7 categories (range <5 - >40)	(1) <5 – 40 (25) (2) >40 (75)
Telepractice with children birth – 36 months of age	7 categories (range <5 - >40)	(1) <5 – 40 (43.75) (2) >40 (56.25)

Values for dependent variables. The frequency of occurrence of each DV, along with means and ranges, are in Table 2. I clustered data into three categories for each dependent variable (DV) so that the data populated each cell in the contingency tables. The values in each category were determined by creating three equal ranges for

each DV. The ranges were established based on my informed clinical opinion. In this way, providers' use of FCEI behaviors were categorized into limited use, average use, and plentiful use. This approach recognized what is actually happening in clinical work in the field. Also, three categories were created for each DV to maintain consistency among the four DVs.

Table 2

Dependent Variables

Type of FCEI Provider Behavior	Mean No. of Occurrences of FCEI Behavior*	Range	Categories
Observation (OB)	58.52	20-112	(1) 20-50 (2) 51-81 (3) 82-112
Direct instruction (DI)	15.93	0-43	(1) 0-14 (2) 15-29 (3) 30-43
Provider feedback about parent (PPF)	13.06	1-28	(1) 1-9 (2) 10-19 (3) 20-28
Provider feedback about child (CBF)	15.68	0-50	(1) 0-16 (2) 17-33 (3) 34-50

*All occurrences of provider behaviors are included.

Observation (OB). This DV occurred most frequently (M = 58.52 times per session; range was 20-112 occurrences per session), and it occurred in each video. Intervals were established so that there were three equally-balanced categories: (a) 20-50; (b) 51-81; and (c) 82-112. The categories are listed in Table 2.

Direct instruction (DI). Direct instruction occurred in 15 videos (*M* = 15.93 times per session; Range was 0-43 occurrences per session). The occurrence of this DV was also divided into three equally-balanced categories: (a) 0-14; (b) 15-29; and (c) 30-43. The categories are listed in Table 2.

Parent practice with feedback (PPF). This behavior occurred at least one time in each of the 16 videos (*M* = 13.06 times per session; range was 1-28 occurrences per session). The range was smaller, but categories are similarly divided into three equally-balanced groups: (a) 1-9; (b) 10-19; and (c) 20-28. The categories are listed in Table 2.

Child behavior with provider feedback (CBF). This behavior occurred at least one time in 14 videos (*M* = 15.68 times per session; range was 0-50 occurrences per session). Categories were again divided into three equally-balanced groups: (a) 0-16; (b) 17-33; and (c) 34-50. The categories are listed in Table 2.

Statistical procedures. My first approach was to address the first two research questions. I produced descriptive statistics for all DVs. Then, I created contingency tables for all combinations of IVs, DVs, and associations between IVs and DVs. Fisher's Exact Test was used as an alternative to the Chi-squared Tests of Independence, based on my small sample size, to investigate the relationship among different categorical variables. Then, Cramer's V was used as a measure of the magnitude of effects. I applied a Generalized Linear Model (GLM) to assess the effects of provider attributes on provider behaviors.

A different approach was used to address the third research question. I calculated the percentages of occurrence of each DV. Then, I systematically compared and contrasted the incidence of these behaviors in my study to existing counts in the literature.

Descriptive statistics. Descriptive statistics for all DVs were collected by inputting the data into SPSS. The descriptive statistics are in Table 3. For the provider behaviors, I reported the different ranges for the occurrence of each IV and the associated percentages. This information was provided, along with explanations and justifications for each IV, earlier in this chapter.

Table 3

Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	SD	Variance
OB	16	92.00	20.00	112.00	69.5000	25.29295	639.733
DI	16	43.00	.00	43.00	15.9375	13.69900	187.663
PPF	16	27.00	1.00	28.00	13.0625	8.94031	79.929
CBF	16	50.00	.00	50.00	15.6875	13.33026	177.696
Valid N (listwise)	16						

Contingency tables. I created contingency tables for each combination of IVs. The same procedure was used for all DVs after consolidating the frequency of occurrence of these behaviors into three groups Lastly, I used Fisher's Exact Test to explore associations between IVs and DVs.

The contingency tables had rows and columns of categorical variables. I redefined the response categories of most of the items so that two or three of the original categories were collapsed together (Huck, 2009). For example, one IV was providers' experience with telepractice with children birth to 36 months of age. This question offered seven options in the survey. I converted the seven original categories into two new categories by merging together the six categories of "less experience" (<5-40 children); the second category was those providers with "the most experience" (> 40

children). By so doing, the contingency tables were more likely to have populated cells. The tables prepared the data so I could look at the association among all independent variables, all dependent variables, and relationships between IVs and DVs. These findings are reported in Chapter IV.

Fisher's Exact Test. I was not able to conduct the Chi-squared Test of Independence to investigate the relationship among different variables because the tables were too sparse to meet the assumptions for the Chi-squared Test. Alternatively, I used Fisher's Exact Test. When frequencies are small, Fisher's Exact Test is a good alternative (Huck, 2009) to evaluate the relationship or association between categorical variables. Categorical variables in the analyses utilized comparisons between two or three categories for each IV and three categories for each DV. The variables for each provider attribute are in Table 1, and the variables for each provider behavior are in Table 2.

Cramer's V. Cramer's V is a measure of the magnitude of effect in a contingency table (Howell, 2004). This is a common index of the strength of association when one or both variables have more than two levels; all of my DVs have three levels.

> Cramer's statistic can range from 0 to 1.00, where a value of 0 indicates no relationship and a value of 1.00 indicates a perfect relationship . . . a larger value of Cramer's V indicates a tendency for particular categories of one variable to be associated with particular categories of the other variable. (Jaccard & Becker, 2002, p. 443)

I first became interested in the magnitude of the effect when I found significance on some associations between IVs and DVs. I used the following Cramer's V values to determine the magnitude of the effect size: .10 = small effect, .30 = moderate effect,

and .50 = large effect (Huck, 2009). For consistency, the Cramer's V statistic is reported for all associations, significant and non-significant, in Chapter IV.

Generalized Linear Model (GLM). I applied a Generalized Linear Model to assess the effects of provider attributes on provider behaviors. A GLM is an extension of linear regression that is appropriate for skewed data; it assesses the strength of the log-linear relationship between an IV and a DV (Agresti, 1996; Cameron & Trivedi, 1998; Tang et al., 2012). The GLM predicts the dependent variable based on the independent variable. I used the GLM to predict how well the model explained my data. I examined, as well, the effects of individual IVs. This was done in order to distinguish those IVs that contributed significantly to the prediction from those that added little to the model.

Goodness of fit. Based on the printout from SPSS, I first reviewed the data in the Goodness of Fit table. Knowing the Value/degree of freedom (df) should be close to 1, I reviewed the value for each of my IV and DV associations. The values ranged from 5.74 to 12.85. These results indicated that there was a poor fit between the predicted and observed counts. The small sample size in my study could have influenced the results. The poor fit may also have been an indication that some important IVs were missing from the model. Missing IVs could include: (a) frequency of in-service training or professional development; (b) content of in-service training; and/or (c) characteristics of pre-service training programs.

In spite of these shortcomings, some inferences about the goodness of fit can be made in that several associations were much closer to a value of 1 than others. These findings are discussed in Chapters IV and V.

Parameter estimates. This measure allowed for a practical interpretation of the data. The relationship between each IV (i.e., provider attributes) and each of the four DVs (i.e., FCEI provider behaviors) was represented by a value that denoted a comparison between the two groups of any one IV (i.e., certification or not, more or less experience conducting FCEI, etc). This value was exponentiated, using Excel, to obtain a multiple. The multiple was used to calculate a meaningful change in the mean number of counts of any one DV based on the two categories of the IV. For example, a parameter estimate of .419 was exponentiated, using Excel, to yield a value of 1.52. If people in one category of the IV averaged 100 instances of an identified provider behavior, the people in the other category of the IV would be expected to average 152 instances of the same behavior. These results are reported for all combinations of IVs and DVs in Chapter IV.

Research Question 3

This research question asked how often FCEI provider behaviors occurred in the telepractice condition in contrast to the frequency of each behavior as it occurred in the F2F condition reported in the literature. I reviewed six studies that included measurements of providers' use of FCEI behaviors in the F2F condition (Campbell & Coletti, 2013; Campbell & Sawyer, 2007, 2009; Colyvas et al., 2010; McBride & Peterson, 1997; Peterson et al., 2007). The data collection procedures for each study varied according to: (a) the number of FCEI provider behaviors measured (*Mdn* = 9.5); and (b) the types of FCEI provider behaviors (i.e., relational, participation-based, and coaching). There was one notable similarity in reporting; three studies reported the percentage of 30-second intervals each provider practice occurred (Campbell & Sawyer,

2007; Friedman et al., 2012; Peterson et al., 2007). I, too, calculated the percentage of 30-second intervals the participants in my study used each of the four behaviors.

In the literature, Campbell and Sawyer (2007; 2009), Colyvas et al. (2010), McBride and Peterson (1997), and Peterson et al. (2007) reported only the predominant behavior in any 30-second interval. I did the same in my study. My task was to describe and contrast the frequency with which four provider behaviors were used in the F2F condition in published research and in the telepractice condition in my study. These comparisons were discussed in the context of percentages.

I found similarities for the use of direct instruction (DI) in both conditions. The use of observation (OB), provider feedback to the parent (PPF), and provider feedback to the parent about the child (CBF) were different in the two conditions. I noted the frequency, in percentages, with which any one behavior occurred in the telepractice condition in my study. Then, I selected the same behavior from the published literature that was conducted in the F2F condition. I reported any similarities or differences in the percentages. The results of these comparisons are discussed in detail in Chapter IV. The implications of these results are discussed in Chapter V.

Last, I proceeded to examine my data in a different way; I identified the prevalence of the four provider behaviors as they occurred in any and all 30-second intervals in the telepractice condition. The implications of this coding strategy are discussed in Chapter V.

CHAPTER IV

RESULTS

There were two purposes for this exploratory study. The first purpose was to examine the potential relationships between provider attributes (the independent variables) and the use of family-centered early intervention (FCEI) provider behaviors (the dependent variables) by professionals delivering the intervention. Statistical analyses were designed to identify any relationships among IVs, any associations among DVs, and any connections between DVs and IVs. The second purpose was to examine the frequency with which specific provider behaviors were used in telepractice and to report these variables in the context of the use of the same behaviors in F2F therapy.

I combined responses for the independent variables (IVs) and the dependent variables (DVs) into categories before conducting my data analyses to accommodate my relatively small sample size ($n = 16$). I noticed that, when I reviewed all results, many cells were empty, and some categories had only one response. I made clinically-relevant determinations to define the two categories for each IV. These decisions were discussed in Chapter III. I clustered frequency counts for each DV into three equal categories.

Sixteen providers participated in this study. Based on this relatively small number of participants, significance was set at $p \leq .05$. Marginal evidence of significance was set at $p \leq .20$. While I did detect some significance; more trends may have been evident with a larger sample. Cramer's V values determined the magnitude of the effect

size as follows: .10 = small effect, .30 = moderate effect, and .50 or greater = strong effect (Huck, 2009). I did not conduct a power analysis because the effect sizes were unknown.

Research Questions 1 and 2

Relationships among Independent Variables

I set out to analyze seven attributes of the 16 providers in this study. As described in Chapter III, the participant pool was relatively homogeneous. Consequently, only six attributes were analyzed: (a) highest degree; (b) Listening and Spoken Language (LSL) Certification as an Auditory-Verbal Therapist (AVT) or Auditory-Verbal Educator (AVEd); (c) experience using FCEI based on number of years; (d) experience using FCEI based on number of children; (e) experience using telepractice with children of any age based on number of sessions; and (f) experience using telepractice with infants and toddlers birth to 36 months of age based on number of sessions. The associations between all IVs are summarized in Table 4.

Table 4

Associations between Independent Variables

Variable 1	Variable 2	Fisher's Exact Test	Cramer's V
Highest degree	Certification	.302	.358
	FCEI experience, # of children	.588	.244
	FCEI experience, # of years	.633	.163
	Telepractice, all ages	1.000	.149
	Telepractice, birth-36 months	.145	.423
Certification	FCEI experience, # of children	1.000	.051
	FCEI experience, # of years	.126**	.492
	Telepractice, all ages	.262	.364
	Telepractice, birth-36 months	.615	.238
FCEI experience, # of children	FCEI experience, # of years	1.000	.051
	Telepractice, all ages	.245	.389
	Telepractice, birth-36 months	1.000	.051
FCEI experience, # of years	Telepractice, all ages	.019*	.655
	Telepractice, birth-36 months	.126**	.492
Telepractice, all ages	Telepractice, birth-36 months	.019*	.655

Note. * = statistically significant ($p \leq .05$); ** = marginally significant ($p \leq .20$).

Significant findings. As reported in Table 4, there was a significant relationship with a large effect (Fisher's exact *P* = .019, Cramer's V = .655) between providers' experience using FCEI, measured in number of years, and experience using telepractice with children of all ages. Another significant association was found with a large Cramer's V between providers' experience using telepractice with children of all ages and use of telepractice with infants and toddlers birth to 36 months of age (Fisher's exact *P* = .019, Cramer's V = .655).

Marginal evidence of significance. As reported in Table 4, there was a marginally significant relationship with a medium effect between providers' highest degree and their experience using telepractice with infants and toddlers (Fisher's exact *P* = .145, Cramer's V = .423). Providers with LSLS Certification as an AVT or AVEd had more experience using FCEI when measured in number of years; this marginally significant relationship had a strong effect (Fisher's exact *P* = .126, Cramer's V = .492). There was a marginal statistical association between FCEI experience, measured in number of years, and telepractice experience with infants and toddlers birth-36 months of age; this association had a strong effect (Fisher's exact *P* = .126, Cramer's V = .492).

Relationships among Independent and Dependent Variables

Contingency tables and associated tests were set up to analyze relationships between the six IVs, attributes of providers, and the four DVs. The four DVs described FCEI provider behaviors: (a) observation (OB); (b) direct instruction (DI); (c) parent practice with feedback (PPF); and (d) child behavior with provider feedback (CBF).

I clustered the data into three equal categories for each DV for consistency. These categories represented: (a) limited use, (b) average use, and (c) plentiful use for

each FCEI provider behavior. The frequency of occurrence of each DV, along with means and ranges, are in Table 2. The relationship between all DVs and IVs is summarized in Table 5.

Table 5

Associations between Provider Attributes (IV) and FCEI Provider Behaviors (DV)

Provider Attribute	Provider Behavior	Fisher's Exact Test	Cramer's V
Highest degree	Observation	.344	.383
	Direct instruction	.321	.455
	Parent Practice with feedback	.668	.251
	Child behavior with provider feedback	.790	.246
Certification	Observation	.431	.389
	Direct instruction	1.000	.111
	Parent practice with feedback	1.000	.077
	Child behavior with provider feedback	.780	.246
FCEI experience (# of children)	Observation	.816	.223
	Direct instruction	.431	.381
	Parent practice with feedback	.816	.263
	Child behavior with provider feedback	.302	.433
FCEI experience (# of years)	Observation	1.000	.134
	Direct instruction	.207**	.495
	Parent practice with feedback	.235	.493
	Child behavior with provider feedback	.012*	.756
Telepractice experience (all ages)	Observation	.769	.316
	Direct instruction	.321	.385
	Parent practice with feedback	.288	.423
	Child behavior with provider feedback	.374	.370
Telepractice experience (infants and toddlers, birth-36 months)	Observation	.816	.223
	Direct instruction	.802	.262
	Parent practice with feedback	.816	.263
	Child behavior with provider feedback	.101**	.524

Note. * = statistically significant ($p \leq .05$); ** = marginally significant ($p \leq .20$).

Associations between highest degree and provider behaviors. As summarized in Table 5, no significance was found between highest degree and any of the provider

behaviors. *P*-values for Fisher's Exact Test ranged from .321 to .790. Appendix I (Tables 17 through 20) offers information about the expected and observed counts for associations between highest degree and four provider behaviors.

Associations between certification and provider behaviors. As summarized in Table 5, no significance was found between certification and the use of any FCEI provider behaviors. *P*-values for Fisher's Exact Test ranged from .431 to 1.0. Appendix I (Tables 21 to 24) offers information about the expected and observed counts for associations between certification and four provider behaviors.

Associations between experience with family-centered early intervention (based on number of children served) and provider behaviors. The information in Table 5 shows no significance between providers' experience with FCEI, based on number of children, and any FCEI provider behaviors. *P*-values for Fisher's Exact Test ranged from .302 to .816. Appendix I (Tables 25 to 28) presents information about the expected and observed counts for associations between experience with FCEI and four provider behaviors.

Associations between experience with family-centered early intervention (based on number of years) and provider behaviors. The information in Table 5 shows a significant relationship and a strong effect between experience with FCEI, based on number of years, and CBF (Fisher's exact $P = .012$, Cramer's $V = .756$). There was marginal evidence of significance for the association between experience and DI with a large Cramer's V (Fisher's exact $P = .207$, Cramer's $V = .495$). While it is generous to consider this finding to be of marginal significance, there was evidence of a strong effect.

There was no significance and a small effect between providers' experience with FCEI, based on number of years, and OB (Fisher's exact *P* = 1.0, Cramer's V = .134). There was no significance and a strong effect between experience in years and PPF (Fisher's exact *P* = .235, Cramer's V = .493). Appendix I (Tables 29 to 32) presents information about the expected and observed counts for associations between years of experience with FCEI and four provider behaviors.

Associations between experience with telepractice (based on children of all ages) and provider behaviors. No significance was found between highest degree and any of the provider behaviors. *P*-values for Fisher's Exact Test ranged from .288 to .769; Cramer's V was moderate for all findings. These results are summarized in Table 5. Appendix I (Tables 33 to 36) presents information about the expected and observed counts for associations between experience with telepractice with children of all ages and four provider behaviors.

Associations between experience with telepractice (based on infants and toddlers birth–36 months of age) and provider behaviors. The results in Table 5 show that there was no significance with a small effect between providers' experience with FCEI, based on number of years, and OB (Fisher's exact *P* = .816, Cramer's V = .223), DI (Fisher's exact *P* = .802, Cramer's V = .262), and PPF (Fisher's exact *P* = .816, Cramer's V = .263). A marginally significant association was found between experience using telepractice with infants and toddlers and CBF with a large effect (Fisher's exact *P* = .101, Cramer's V = .524). Appendix I (Tables 37 to 40) presents information about the expected and observed counts for associations between experience with FCEI and four provider behaviors.

Relationships among Dependent Variables

Four DVs described FCEI provider behaviors: (a) observation (OB); (b) direct instruction (DI); (c) parent practice with feedback (PPF); and (d) child behavior with provider feedback (CBF). The associations between all DVs are reported in Table 6.

Table 6

Associations among Dependent Variables

Variable 1	Variable 2	Fisher's Exact Test	Cramer's V
Observation	Direct instruction	.371	.423
	Parent practice with feedback	.126**	.525
	Child behavior with provider feedback	1.000	.180
Direct instruction	Parent practice with feedback	.209**	.440
	Child behavior with provider feedback	.080*	.536
Parent practice with feedback	Child behavior with provider feedback	.034*	.547

Note. * = statistically significant ($p \leq .05$); ** = marginally significant ($p \leq .20$).

Significant findings. There was a significant association, with a strong effect, between the use of PPF and CBF (Fisher's exact $P = .034$, Cramer's V = .547). The strong effect recognizes that the association between these variables was relatively robust.

Marginal evidence of significance. There were three marginally significant relationships among the DVs. A marginally significant association, with a strong effect, was found between OB and PPF (Fisher's exact $P = .126$, Cramer's V = .525). Another

marginally significant association, with a medium to large effect, was found between DI and PPF (Fisher's exact $P = .209$, Cramer's V = .440). The association between the use of DI and CBF was marginally significant, with a large Cramer's V (Fisher's exact $P = .080$, Cramer's V = .536).

Generalized Linear Model (GLM)

The GLM was used to assess the strength of the log-linear relationship between IVs and DVs. I used the GLM to predict how well the model explained my dependent variables. I counted how frequently each provider behavior occurred during a recorded session for each provider ($n = 16$). I looked at two measurements: goodness of fit and parameter estimates. Then, I reported on the significance of the parameter estimates.

Goodness of Fit

Table 7 shows the goodness of fit among IVs and DVs. A Value/degree of freedom (df) close to 1 indicates a good fit. The Value/df for my variables ranged from 5.74 to 12.85, indicating that there was a poor fit between the predicted and observed counts. The small sample size most likely influenced this finding. While I exercised caution in trusting the model results as a description of my data, the values of 5 and 6 were relatively small compared to measurements of other relationships. The variables with a better fit were, therefore, of relative interest. They will be discussed in Chapter V.

Table 7

Goodness of Fit between Provider Attributes (IV) and FCEI Provider Behaviors (DV)

Provider Attribute	Provider Behavior	Goodness of Fit
Highest degree	Observation	9.897
	Direct instruction	10.387
	Parent Practice with feedback	6.329*
	Child behavior with provider feedback	12.323
Certification	Observation	9.477
	Direct instruction	12.539
	Parent practice with feedback	6.562*
	Child behavior with provider feedback	11.027
FCEI experience (# of children)	Observation	9.594
	Direct instruction	12.602
	Parent practice with feedback	5.541*
	Child behavior with provider feedback	10.813
FCEI experience (# of years)	Observation	9.849
	Direct instruction	11.237
	Parent practice with feedback	6.670*
	Child behavior with provider feedback	5.744*
Telepractice experience (all ages)	Observation	8.987
	Direct instruction	12.823
	Parent practice with feedback	6.760*
	Child behavior with provider feedback	12.240
Telepractice experience (infants and toddlers, birth-36 months)	Observation	9.917
	Direct instruction	12.837
	Parent practice with feedback	6.094*
	Child behavior with provider feedback	12.859

Note. * = associations of interest based on relative adequate fit.

Parameter Estimates

Parameter estimates were obtained using the Poisson distribution (Agresti, 1996; Cameron & Trivedi, 1998; Tang et al., 2012) to model the data. The Poisson distribution applies under these circumstances: (a) the DV can be counted in whole numbers (e.g., each provider behavior has a frequency count); (b) occurrences are independent; and (c) the average frequency of occurrences per time period is known (e.g., an entire telepractice session). My analyses met these criteria.

Associations in the model. Some inferences could be made about the goodness of fit in the model. These inferences were based on those associations that were relatively closer to a value of 1 than other relationships. Out of 24 associations, the lowest values ranged from 5 to 6; seven relationships had these lowest values. While these values were not significant, per se, the relatively low Value/df made these models a "better fit" with the data than any of the other variables.

A procedure was used to determine the clinical relevance of the parameter estimates (Agresti, 1996; Cameron & Trivedi, 1998; Tang et al., 2012). The Poisson distribution gave an expected frequency count for each provider behavior (i.e., OB, DI, PPF, and CBF). When the data for the categories of the IV had similar frequencies for any one DV, there was no compelling reason to believe that the IV affected the DV; rather, any differences could be based solely on random factors. Conversely, if the difference in occurrence of a provider behavior were large for the two groups of an IV, it was investigated. Potential reasons for these differences are discussed in Chapter V. All findings must be interpreted cautiously because the participant sample was small.

Another complicating factor was that three of the videos were shorter than the majority of the recordings. The variation in length of videos can lead to the counts being misleading. It is reasonable to expect that the observed counts would essentially double for all of the behaviors for this group; this would have the likely effect of deflating the number of times each behavior was observed for these sessions. Another concern, albeit less likely, is that a shorter amount of observation time could, overall, lead to errors in the findings and the subsequent interpretations. For example, if the provider behaviors in a longer video changed in the course of a 1-hour timeframe, the analyses of only the first 30 minutes could bias the data toward an incorrect conclusion about providers' behaviors. I suspect this confounding issue is unlikely in that the majority of the videos approached 60 minutes in length.

Associations between highest degree and family-centered early intervention provider behaviors. When looking at goodness of fit, one FCEI provider behavior—parent practice with feedback (PPF)—had a value of 6.329. This is reported in Table 31. This was a relatively small Value/df among my variables.

Parameter estimates were investigated by categorizing providers into two groups based on highest degree: (a) communication disorders; or (b) deaf education. These results are in Table 8. Use of OB and CBF were similar for the two groups. For example, assuming providers who earned their highest degree in deaf education used 100 instances of OB in a session, the providers whose highest degree was in communication disorders would be expected to use OB in a similar amount of 87.6 times in a session. Another example looked at the similar use of CBF by providers in both groups. If deaf educators, hypothetically, used CBF 100 times in a session, providers with their highest

degrees in communication disorders would be expected to use 105 instances of CBF in a session. Use of DI varied for the two groups. If providers with their highest degrees in deaf education used DI 100 times, providers in the field of communication disorders would be expected to use 258 occurrences of DI. The opposite was true for the use of PPF. If deaf educators used PPF 100 times, those with their highest degrees in communication disorders would be expected to use only 65.3 occurrences of PPF.

Table 8

Highest Degree (Communication Disorders and Deaf Education) and Provider Behavior Occurrence

Provider Behaviors	Parameter Estimate	p-value	Value (Parameter Estimate (Exponentiated)	Communica-tion Disorders*	Deaf Education*
Observation	-.132	.03000	.876	87.6	100
Direct instruction	.951	<0.0001	2.580	258.0	100
Parent practice with feedback	-.425	.0020	.653	65.3	100
Child behavior with provider feedback	.053	.6840	1.050	105.0	100

Note. *Extrapolated results for occurrences of provider behaviors based on highest degree.

Associations between certification and family-centered early intervention provider behaviors. Goodness of fit is reported in Table 7. The Value/df for PPF was 6.562. The other associations had Values/df that approached or exceeded 10.

Parameter estimates were examined by categorizing providers into two groups: (a) having LSLS Certification as an Auditory-Verbal Therapist (AVT) or an Auditory-Verbal

Educator (AVEd); and (b) not having LSLS Certification. As reported in Table 9, the two groups hypothetically used a similar number of OB, DI, and PPF behaviors in a session. According to this model, providers with LSLS Certification as an AVT or AVEd would be expected to use less CBF than those providers without this certification. If providers without LSLS certification used 100 occurrences of CBF in a session, their peers with certification used only 66.8 occurrences.

Table 9

Certification (LSLS and No LSLS) and Provider Behavior Occurrence

Provider Behaviors	Parameter Estimate	p-value	Value (Parameter Estimate (Exponentiated)	LSLS Cert AVT or AVEd*	No LSLS*
Observation	.105	.085	1.11	111.0	100
Direct instruction	.073	.565	1.07	107.0	100
Parent practice with feedback	-.108	.438	.897	89.7	100
Child behavior with provider feedback	-.403	.001	.668	66.8	100

Note. *Extrapolated results for occurrences of provider behaviors based on certification.

Associations between experience with family-centered early intervention in years and in provider behaviors. Goodness of fit is reported in Table 7. Two associations were relatively close to 1 in the goodness of fit model. The Value/df for PPF was 6.670. The use of CBF was also a relatively small Value/df; the goodness of fit was 5.744.

Parameter estimates were studied based on providers having had fewer or more years of experience using FCEI. The two categories used in the analyses were: (a) 0-9 years of experience; and (b) 10 or more years of experience. As reported in Table 10, the two provider groups used a similar number of two FCEI provider behaviors—OB and PPF. The less-experienced providers, hypothetically, used more direct instruction; if more-experienced providers used 100 occurrences of DI, the less-experienced providers used DI 227 times. Less-experienced providers would hypothetically use even more CBF. If more-experienced providers used 100 occurrences of CBF, their less-experienced peers would use CBF 360 times.

Table 10

FCEI Experience (0-9 Years and 10+ Years) and Provider Behavior Occurrence

Provider Behaviors	Parameter Estimate	p-value	Value (Parameter Estimate (Exponentiated)	Experience with 0-9 Years*	Experience with 10+ Years*
Observation	.031	.6070	1.03	103	100
Direct instruction	.823	<0.0001	2.27	227	100
Parent practice with feedback	.088	.5250	1.09	109	100
Child behavior with provider feedback	1.282	<0.0001	3.60	360	100

Note. *Extrapolated results for occurrences of provider behaviors based on FCEI experience in years.

Associations between experience with family-centered early intervention in number of children and in provider behaviors. Consistent with other goodness of fit

associations, the Value/df for PPF was relatively close to 1 at 5.541. This was the smallest Value/df in the model.

Parameter estimates are in Table 11. Based on experience with FCEI, as measured by number of children, providers were placed into two categories: (a) having seen <5-20 children; and (b) having seen 21-40+ children. According to the model, the groups would use similar amounts of OB and DI during a session. The group with less experience would use less PPF; if more-experienced providers used PPF 100 times, providers with less experience would have had only 45.7 occurrences. Conversely, if providers with more experience used 100 occurrences of CBF, their peers with less experience would make 50% more attempts with 150 occurrences.

Table 11

FCEI Experience (<5-20 and 21-40+ Children) and Provider Behavior Occurrence

Provider Behaviors	Parameter Estimate	p-value	Value (Parameter Estimate (Exponentiated)	Experience with <5-20 Children*	Experience with 21-40+ Children*
Observation	-.162	.0150	.850	85.0	100
Direct instruction	.182	.1640	1.190	119.0	100
Parent practice with feedback	-.781	<0.0001	.457	45.7	100
Child behavior with provider feedback	.409	.0010	1.500	150.0	100

Note. *Extrapolated results for occurrences of provider behaviors based on experience with number of children.

Associations between experience with telepractice with children of all ages and provider behaviors. In the goodness of fit model described in Table 7 there was one association relatively close to a Value/df of 1. Once again, the association was the use of PPF with a Value/df of 6.760.

Parameter estimates were studied based on providers' experience using telepractice with children of any age. The two categories used in the analyses were: (a) having seen <5-20 children; and (b) having seen 21-40+ children. As reported in Table 12, the two groups would differ in the use of all four provider behaviors—OB, DI, PPF, and CBF. The providers with less experience using telepractice with all children (e.g., <5-40 children) used more of each provider behavior than the providers with more experience with telepractice. If more experienced providers used 100 occurrences of each provider behavior, the less-experienced providers would hypothetically use 129 occurrences of OB, 137 occurrences of DI, 132 occurrences of PPF, and 179 occasions for CBF.

Table 12

Telepractice Experience All Ages (<5-40 and >40 Children) and Provider Behavior Occurrence

Provider Behaviors	Parameter Estimate	p-value	Value (Parameter Estimate (Exponentiated)	Experience with <5-40 Children*	Experience with >40 Children*
Observation	.257	<0.0001	1.29	129	100
Direct instruction	.316	.0190	1.37	137	100
Parent practice with feedback	.281	.0610	1.32	132	100
Child behavior with provider feedback	.586	<0.0001	1.79	179	100

Note. *Extrapolated results for occurrences of provider behaviors based on experience with telepractice with children of any age.

Associations between experience with telepractice with infants and toddlers and provider behaviors. The only goodness of fit association in this model that was relatively close to a Value/df of 1 was for PPF; the Value/df was 6.094. All other associations were close to or exceeding a Value/df of 10.

Parameter estimates were investigated using the same categories to delineate providers' experience with telepractice with children birth to 36 months of age: (a) having seen <5-20 children; and (b) having seen 21-40+ children. These results are in Table 13. The hypothetical results, according to this model, showed providers with less experience using more occurrences of DI and CBF than their more experienced counterparts. Should more-experienced providers use 100 occurrences of DI, their less-

experienced peers would use 164 occurrences. If the more-experienced providers used 100 occurrences of CBF, the less-experienced providers would use CBF 152 times. Conversely, providers with less experience using telepractice with infants and toddlers would use OB and PPF less frequently. Should more-experienced providers use 100 occurrences of OB, less-experienced providers would use only 89 occurrences in the same amount of time. And, if more-experienced providers used PPF 100 times, their less-experienced counterparts would use only 73.4 occurrences.

Table 13

Telepractice Experience Birth-36 Months (<5-40 and >40 Children) and Provider Behavior Occurrence

Provider Behaviors	Parameter Estimate	p-value	Value (Parameter Estimate (Exponentiated)	Experience with <5-40 Children*	Experience with >40 Children*
Observation	.419	.0650	1.52	152.0	100
Direct instruction	-.112	<0.0001	.894	84.0	100
Parent practice with feedback	.496	.0320	1.64	164.0	100
Child behavior with provider feedback	-.308	.0010	.734	73.4	100

Note, *Extrapolated results for occurrences of provider behaviors based on experience with telepractice with infants and toddlers.

Research Question 3

I counted the frequency of occurrence of the four provider behaviors, my DVs, in the telepractice condition. I counted the incidence of each of these DVs; first, the

incidence was counted only when the behavior was prominent (e.g., it occurred for the highest number of seconds) in a 30-second interval. This procedure replicated what was done in the F2F condition in several studies in the literature (Campbell & Sawyer, 2007, 2009; Colyvas et al., 2010; McBride & Peterson, 1997; Peterson et al., 2007). I contrasted the frequency counts in my telepractice condition, which were calculated and reported in percentages, to the occurrence of the same behaviors reported in the literature. These results are in Table 14.

Table 14

Frequency of FCEI Provider Behaviors in Treatment Sessions (Face-to-Face and Telepractice)

	% FCEI Behavior			
	Observation	Direct Instruction	Parent Practice with Feedback	Child Behavior with Provider Feedback
Mean in telepractice	79	12	3	6.5
Range in telepractice	56-100	0-36	0-10	0-23
F2F (Campbell & Sawyer, 2007)	27[1]; 24[2]	—	—	—
F2F (Campbell & Sawyer, 2009)	6[3]; 12[4]	—	—	—
F2F (Colyvas et al., 2010)	36[5]	19[5]	6[5]	—
F2F (McBride & Peterson, 1997)	7[6]	—	.36[6, 7]	.36[6, 9]
F2F (Peterson et al., 2007)	7[6]	—	.36[6, 8]	.36[6]

Note. [1]Natural Environment Rating Scale (NERS); [2]Home Visit Observation Form Modified (HVOF-M); [3]Natural Environment Rating Scale (NERS) after one training; [4]Natural Environment Rating Scale (NERS) after two trainings; [5]Teacher Caregiver Scale (TCS); [6]Home Visit Observation Form (HVOF); [7]Item coded as "coaching supporting parent"; [8]Item coded as "coaching supporting parent-child interactions; [9]Item coded as "parent is primarily working with child, but interventionist provides encouragement or suggestions, comments on child's response" (McBride & Peterson, 1997, p. 220).

I also calculated the frequency of the occurrence of the four provider behaviors when they occurred in *any* position in a 30-second interval. It is notable that the percentages were different when they were calculated this way. The comparisons were of interest; the percentage of occurrence differed when a behavior was counted only in the predominant position and then recounted as it occurred in *any* position. For example, the

use of parent practice with feedback (PPF) accounted for 3% (range = 0-36%) of the behaviors in a session when the behavior was counted only in the predominant position in a 30-second interval. When PPF was counted in any position in a 30-second interval, it accounted for 10% (range = 1-22%) of the behaviors in a session. The percentages for all four behaviors are reported in Table 15. No comparisons can be made to the literature when behaviors are counted in any position. However, the implications are discussed in Chapter V.

Table 15

Frequency of FCEI Provider Behaviors, All Occurrences

FCEI Behavior	Mean in Telepractice (%)	Range in Telepractice (%)
Observation	63	40-93
Direct instruction	14	0-35
Parent practice with feedback	10	1-22
Child behavior with provider feedback	12	0-31

Comparisons Based on Predominant Occurrence of Family-centered Early Intervention Behaviors

The comparisons of the frequency of FCEI behaviors in F2F and telepractice are in Table 16. Observation was used much more frequently in the telepractice condition than in F2F therapy. Direct instruction was used less in the telepractice condition. A

comparison of the use of parent practice with feedback (PPF) was inconclusive. The use of PPF in telepractice occurred more frequently than it did in two studies conducted in the F2F condition (McBride & Peterson, 1997; Peterson et al., 2007). However, PPF occurred less frequently when compared to the F2F condition in the study conducted by Colyvas et al. (2010). The use of child behavior with provider feedback (CBF) in telepractice exceeded the prevalence of CBF in the published literature (McBride & Peterson, 1997; Peterson et al., 2007).

Table 16

Frequency of FCEI Provider Behaviors in Two Conditions

FCEI Behavior	Mean in Telepractice: Predominant Behavior (%)	Range in Telepractice: Predominant Behavior (%)	Mean in Telepractice: All Occurrences (%)	Range in Telepractice: All Occurrences (%)
Observation	79.0	56-100	63	40-93
Direct instruction	12.0	0-36	14	0-35
Parent practice with feedback	3.0	0-10	10	1-22
Child behavior with provider feedback	6.5	0-23	12	0-31

CHAPTER V

CONCLUSIONS

Discussion

The first purpose of my study was to identify potential relationships between provider attributes and the use of family-centered early intervention (FCEI) provider behaviors. The analyses showed some relationships between provider attributes (i.e., educational discipline, experience with FCEI, and experience with telepractice), associations between providers' use of FCEI strategies (i.e., OB, DI, PPF, and CBF), and relationships between provider attributes and provider behaviors.

The second purpose of the study was to examine the frequency with which specific FCEI provider behaviors were used in telepractice in contrast to the use of the same behaviors in F2F therapy reported in the literature. The findings have implications for training providers. The burgeoning use of telepractice will likely be associated with new training opportunities (A. Ferguson, personal communication, December 12, 2014; K. Dyson, personal communication, October 23, 2014; Peacock, 2014).

The descriptions of the four behaviors in my study, along with the implications for their use in telepractice are: (a) observation (OB); (b) direct instruction (DI); (c) parent practice with feedback (PPF); and (d) child behavior with provider feedback (CBF). Each behavior is described here along with implications for its use in telepractice.

Observation (OB) requires the provider to notice the parent's skills, the child's performance, and the interaction between parent and child. The use of OB is an expectation in FCEI practice. OB is a critical behavior when delivering services via telepractice. The parent is now the primary person interacting with the child; the provider, while watching, can objectively notice parent and child behaviors.

The purpose of DI is to teach a concept or skill (Woods et al., 2011). Instruction can be delivered using print, verbal, and/or video information (Friedman et al., 2012). In telepractice, the provider relies on DI to teach skills. Modeling is not an easy option because the provider is not in direct contact with the infant or toddler.

Using PPF, the provider offers prompts, recommendations, reinforcement, and/or encouraging comments to the parent, specifically about the parent's behaviors (Basu et al., 2010; Campbell & Coletti, 2013; Colyvas et al., 2010; Woods et al., 2011). This skill is easily accomplished in telepractice; the provider's suggestions and prompts may describe what is working and/or what can be done differently. This behavior seems to be a natural sequel to the provider's observations.

As the parent interacts with the child, the provider can offer feedback to the parent about the child's behavior (Friedman et al., 2012). This strategy–CBF–can help the parent to see when a strategy benefits the child. This, in turn, may help the parent to intentionally use the technique and to use it more frequently, which can facilitate good child outcomes (Woods et al., 2011). CBF, in addition to PPF, is a logical follow-up to the provider's observations.

Relationships between Provider Attributes

Sixteen providers participated in this study. I initially planned to analyze seven attributes of these providers. Because of the homogeneity of the participant pool, six attributes were analyzed: (a) highest degree; (b) Listening and Spoken Language (LSL) Certification as an Auditory-Verbal Therapist (AVT) or Auditory-Verbal Educator (AVEd); (c) experience using FCEI measured in number of years; (d) experience using FCEI based on number of children served; (e) experience using telepractice with children of any age; and (f) experience using telepractice with infants and toddlers birth to 36 months of age.

Significant findings. There was a statistically significant relationship for providers' experience using FCEI, measured in years, and their experiences using telepractice with children of all ages. This finding suggests that more experienced providers are the ones who are engaged in telepractice. There could be several reasons to explain this finding. One reason relates to the distance between a provider and a family and the costs and time associated with travel; remote services can reduce travel time and accompanying costs such as mileage reimbursement (Olsen et al., 2012). Perhaps the more experienced providers were willing to reach out to families who did not live close to them. This may reflect parent requests for services from established therapists. It may also reflect an experienced therapist's comfort delivering FCEI and the willingness of those veteran therapists to try an alternative delivery platform such as telepractice. While telepractice has costs associated with hardware and bandwidth, there is documentation that consumers of pediatric speech-language pathology services view travel costs as a barrier to accessing services (Bashshur, 1995; O'Callaghan, McAllister, & Wilson, 2005).

The cost savings for travel and mileage reimbursement apply to families living in busy urban areas with high traffic volume as well as to families living in remote and rural communities.

Providers' commitments to delivering listening and spoken language services may also explain the association between providers' experience using FCEI and their experience using telepractice with children of all ages. All providers in my study were affiliated with private and/or not-for-profit agencies that promoted the delivery of auditory-verbal practice. By using telepractice, providers can reach more families; for many families living in rural areas, it is not practical to drive many hours to see a therapist for a one-hour therapy session. There could be financial benefit when an agency delivers services to more children.

A third reason may be that experienced providers are willing to try something new—in this instance, telepractice. It is also possible that agency directors are asking the more-experienced providers to be the first ones to use telepractice.

Another significant association was found between providers' experience using telepractice with children of all ages and the use of telepractice with infants and toddlers birth to 36 months of age. The underpinning reasons for this relationship may reflect the demand for services for infants and toddlers. There is growing interest in using telepractice to reach infants and toddlers with all types of disabilities (Cason, Behl, & Ringwalt, 2012; T. Dyson, personal communication, October 23, 2014). There is also a growing interest in serving infants and toddlers who are DHH via telepractice (Blaiser, Behl, Callow-Huesser, & White, 2013; Behl, Houston, & Stredler-Brown, 2012; Blaiser et al., 2012; Broekelmann, 2012; Davis et al., 2012; Hamren & Quigley, 2012; Hopkins

et al., 2012; Houston & Behl, 2012; McCarthy, 2012; National Center for Hearing Assessment and Management, 2014; Olsen et al., 2012; Peters-Lalios, 2012). There is a sense of urgency to serve infants and toddlers; this urgency is underscored by the requirements in IDEA (2004) wherein agencies must identify, secure, and initiate services within 28 days of a referral for services.

Marginal evidence of significance. The relationship between providers' highest degree and experience using telepractice with infants and toddlers was marginally significant; teachers of the DHH had more experience using telepractice with infants and toddlers. One plausible reason is that some organizations that use telepractice may choose to employ teachers of the DHH. This could be purposeful or coincidental.

Another finding with marginal evidence of significance was the association between providers with LSLS Certification as an AVT or AVEd and more years of experience delivering FCEI. In this study, seven LSLS certified providers had more than 10 years experience delivering FCEI; only two providers, who were not LSLS certified, had this much experience. It is possible that initiatives within professional organizations are an underlying reason for this finding. For instance, the LSLS Certification for AVTs and AVEds promotes the delivery of FCEI (AG Bell, 2007, 2013), and the certificate program emphasizes training in the use of FCEI techniques (AG Bell, 2007, 2013). In addition, the American Speech, Language, Hearing Association (ASHA) has published documents supporting and guiding the delivery of FCEI (ASHA, 2008; Martin, Nicholson, & Hall, 2012). Conversely, I am not aware of any comparable documents issued by organizations supporting teachers of the DHH. This includes the Council on the Education of the Deaf (CED) and the Conference of Educational Administrators of

Schools and Programs for the Deaf (CEASD). Simply stated, more support for training in the use of FCEI strategies may result in more use of these techniques.

Marginal significance was found for the association between FCEI experience, measured in years, and telepractice experience with infants and toddlers birth-36 months of age. Perhaps this finding simply reflects a logical consequence of having a lot of experience in FCEI. It was already shown that these experienced providers were more likely to provide telepractice to children of any age. It follows, then, that there would be an increased likelihood that telepractice could be offered to infants and toddlers.

Interesting relationships. Some relationships among provider attributes were of interest even though a statistical association was not detected. The absence of statistical significance could be attributed to the limited number of observations in this study.

Of those providers with LSLS certification, seven earned their highest degrees in communication disorders; only two providers were teachers of the DHH. As mentioned previously, training in the use of FCEI is supported by ASHA (2008) which is the organization for speech-language pathologists and audiologists. This level of training support is not offered by professional organizations representing teachers of the DHH (J. Jamieson, personal communication, July 4, 2014; S. Bowen, personal communication, March 3, 2012).

Another interesting finding, though not significant, was the relationship between highest degree earned and the amount of experience, in years, using FCEI. Nine providers from communication disorders and deaf education had 10 or more years of experience; five providers from communication disorders and four from deaf education had 10 or more years of experience. Seven participants had less than 10 years of

experience. This group had five providers from the field of communication disorders and only two from deaf education. The point of interest here is that some participants trained in communication disorders have little experience, but they are conducting telepractice regardless. This reinforces the previously mentioned comment that pre-service training in communication disorders offers students more exposure to working with infants and toddlers than do deaf education training programs.

LSLS certified providers in this study were more experienced using telepractice with children of all ages. This finding may reflect the persistent efforts of not-for-profit programs that offer auditory-verbal practice to expand their outreach services. Funding from foundations promotes the delivery of auditory-verbal practice nationwide (B. Rosenfeld, personal communication, April 11, 2014). Parents may also be seeking providers with LSLS certification when they want to implement a listening and spoken language approach. LSLS certified AVTs and AVEds most assuredly focus on the use of hearing technology to support access to listening and spoken language.

Relationships between Provider Attributes and Family-centered Early Intervention Provider Behaviors

My first hypothesis was that provider attributes and provider behaviors were related in the population. I found one significant relationship and two associations that demonstrated marginal significance. In addition, there were some interesting associations even when statistical significance was not found.

Significant findings. The use of child behavior with provider feedback (CBF) was associated with providers' experience delivering FCEI. This behavior is highly regarded for its effectiveness in the literature (Woods et al., 2011); it was, therefore, of

high interest. The curiosity in this finding was that the providers with *less* experience delivering FCEI, measured in number of years, were the providers who used *more* CBF. Despite the benefit associated with the use of CBF, only six providers used moderate or high amounts of it. This finding could reflect the pre-service and/or in-service training of these providers. In my opinion, the use of this strategy can be so effective that its use should be promoted.

Marginal evidence of significance. The relationship between the number of years of experience with FCEI and use of direct instruction (DI) was marginally significant. Direct instruction (DI) was included as a FCEI behavior in this study because of its heightened importance when delivering services via telepractice. In telepractice, the provider cannot handily demonstrate a technique since the child is not with the provider. Telepractice, then, lends itself to use of this strategy; using DI, the provider shares information intentionally and systematically to promote parental understanding and skill mastery (Colyvas et al., 2010). Only three providers in this study used DI frequently; two of these providers had been delivering FCEI for fewer than 10 years, while one provider had more years of experience. The majority of providers, seven in all, provided only a modicum amount of DI. There are two considerations to explain this finding. One reason could be the lack of training, in pre-service and in-service programs, in the use of DI. Another plausible reason could be the tendency for providers to use robust amounts of observation (OB) in telepractice sessions. Perhaps the frequent use of OB precluded the use of DI. The implications of the disproportionate use of OB in the telepractice condition will be discussed later in the chapter.

The marginal relationship between experience using telepractice with infants and toddlers and the use of CBF was surprising. Providers who had worked with more than 40 children in the telepractice condition were the same providers that used the *least* amount of CBF. As discussed previously, this finding could reflect the pre-service and/or in-service training of these providers. Perhaps, more experienced providers used strategies they learned before the emphasis on coaching techniques became popular.

Interesting relationships. Parent practice with feedback (PPF) is another behavior that is based on adult learning theory (Lave & Wenger, 1991, as cited in Freidman et al., 2012). A provider's use of PPF guides the parent's behavior while the parent is engaged with the child. The provider feedback is intended to support a parent's mastery of a strategy or technique (Donovan, Bransford, & Pellegino, 1999, as cited in Woods et al., 2011). Providers with more years of experience used varying amounts of PPF: (a) four providers used very little PPF; (b) two providers used a moderate amount of PPF; and (c) three providers used PPF frequently. Providers with fewer years of experience delivering FCEI used PPF more frequently; five of seven providers used moderate amounts of PPF. These findings are curious and led me to question the pre-service and in-service training of the providers. Training in the use of PPF does not yet seem to be the norm. But, less-experienced providers, who may be the same participants who received their training more recently, seem to have an advantage.

There was frequent use of observation (OB) by all providers, irrespective of their attributes. This noteworthy finding, along with its implications, will be discussed in more detail later in this chapter.

Relationships between Provider Behaviors

A family-centered approach to early intervention expects the therapist to have a unique set of skills. I selected four provider behaviors (i.e., OB, DI, PPF, and CBF), all participatory-based, from a body of literature (Basu et al., 2010; Campbell & Sawyer, 2007; Colyvas et al., 2010; Friedman et al., 2012; McBride & Peterson, 1997). These provider behaviors are considered good practice when delivering FCEI. My purpose in investigating the associations between provider behaviors was to explore the likelihood that the use of one behavior promoted the use of another behavior when therapy was conducted using telepractice. The use of telepractice to deliver FCEI is becoming more prevalent (Blaiser et al., 2012; Broekelmann, 2012; Davis et al., 2012; Hamren & Quigley, 2012; Hopkins et al., 2012; McCarthy, 2012; Peters-Lalios, 2012; Richardson, 2012; Simmons, 2012; Stith et al., 2012); consequently, there are many training opportunities. Any associations between these behaviors could be used in future trainings of practitioners using telepractice.

Significant findings. There was a statistically significant relationship between the use of parent practice with feedback (PPF) and child behavior with provider feedback (CBF). Limited use of PPF was associated with limited use of CBF for four providers. A moderate amount of PPF was associated with moderate amounts of CBF for four providers. This association seems reasonable; PPF and CBF require the provider to notice characteristics of the parent and/or child, to make inferences about their observations, and to offer verbal feedback. There is one curious finding in these data; the high amounts of PPF were associated with low amounts of CBF for four providers. It

was surprising that these providers consistently reported on parents' use of a strategy, while rarely commenting on the child's performance.

Marginal evidence of significance. It is important to set up a context for the use of observation (OB) in telepractice. The frequent use of OB will be described later in this chapter in the context of it outperforming the use of OB in the face-to-face (F2F) intervention.

All participants in this study used OB often. This strategy is easy to do—especially in telepractice. The three other behaviors I measured (i.e., DI, PPF, and CBF) occurred less frequently than OB. Because OB was used so often, pairing its use with other FCEI behaviors could be valuable in professional development offerings. There was a marginally significant relationship between the use of OB and parent practice with feedback (PPF). Five providers used a moderate amount of OB and a moderate amount of PPF. Of the providers who used OB the most, they used varying amounts of PPF: (a) one provider used a lot of OB, but used very little PPF; (b) two providers used a lot of OB and a moderate amount of PPF; and (c) two providers used plenty of OB and a lot of PPF. It is a bit confounding that three providers used very little OB and very little PPF. I question the implementation of FCEI when neither of these behaviors was used robustly.

The relationship between direct instruction (DI) and PPF also showed marginal significance. The value of this association, clinically speaking, is the fact that it reflects good coaching practice (Peterson et al., 2007; Rush & Shelden, 2005, 2011; Rush et al., 2003; Salisbury et al., 2010). When a provider instructs a parent in the use of a strategy (e.g., DI), it seems logical that the provider would also comment on a parent's use of the technique. But, this did not always happen. There may be several explanations for this.

Five providers used little DI and also used small amounts of PPF. This seems logical; if the provider were not teaching a technique, there would be less inclination to comment on a parent's implementation of it. However, four providers who used little DI used moderate and large amounts of PPF. Four providers implemented what is deemed most appropriate; these providers used moderate amounts of DI and moderate to large amounts of PPF. Three providers used DI frequently and complemented the use of this strategy with moderate to large amounts of PPF.

There was a marginal association between DI and child behavior with provider feedback (CBF). CBF and PPF are similar behaviors; both provide feedback to the parent. The difference is that PPF focuses on the parent's behavior, while CBF focuses on the child's actions. Seven providers used little DI and made few attempts to use CBF. At the other extreme, no providers used both behaviors—DI and CBF—frequently, even though this would seem to be a logical pairing of FCEI provider behaviors.

Interesting relationships. I noticed the absence of any relationship between observation (OB) and child behavior with provider feedback (CBF). Providers used observation in varying amounts (i.e., infrequently, moderately, or frequently). Among the 16 providers, 9 used CBF infrequently, 5 used CBF in moderate amounts, and 2 providers used CBF often. This is notable in that CBF is a robust coaching strategy. The purpose of CBF is to help the parent to see when a strategy benefits the child. This, in turn, may help the parent to intentionally use the technique and to use it more frequently, which can facilitate good child outcomes (Woods et al., 2011). It was surprising to notice that providers observed without commenting, with any regularity, on the child's skills.

General Linear Model (GLM)

When events occur over time, it can be relevant to model the rate at which events occur (Agresti, 1996). The Poisson regression approach included two analyses: (a) goodness of fit; and (b) parameter estimates. The findings from the model can inform clinical practice and pre-service or in-service training programs. Caution must be exercised when considering these outcomes. Tang et al. (2012) stated that if the sample size is small, "the sample size may not be large enough to arrive at a reliable conclusion" (p. 207).

Goodness of fit. The Poisson distribution is a potential probability model for the observed counts of the dependent variables, using the independent variables (Agresti, 1996). Values close to 1, using the statistic of deviance/value DF, would represent a "good" fit; thus, indicating that the model approximates the data. The smallest values in my model were closer to 5 and 6. These relatively small goodness of fit ratios were followed up with interpretations while the larger values were not. Therefore, I exercise caution in trusting the model results as a description of my data. The values of 5 and 6, it should be noted, are relatively small compared to measurements of other relationships. The variables with a better fit are, therefore, of relative interest.

Associations between provider attributes and the use of parent practice with feedback (PPF) were consistently smaller values. This suggested that the association between PPF and all provider attributes (i.e., highest degree, LSLS certification, experience with FCEI, and experience with telepractice) were, relatively speaking, sensitive aspects of the model.

The association between provider experience delivering FCEI, measured in years, and the use of child behavior with provider feedback (CBF) was a better fit. Again, relative to associations among other variables, this model explained the data well.

Throughout my analyses, the use of PPF and CBF were of special interest. The findings for goodness of fit were no exception. Practically speaking, these two strategies were used infrequently. Yet, the literature strongly endorses the use of these two coaching practices (Dunst & Trivette, 2009a, 2009b; Espe-Sherwindt, 2008; Flaherty, 1999; Fleming et al., 2011; Kinlaw, 1999; Peterson et al., 2007; Rush & Shelden, 2005, 2011; Rush et al., 2003; Salisbury et al., 2010; Woods et al., 2011). Perhaps the use of PPF and CBF are exceptionally good indicators of the delivery of FCEI.

Parameter estimates. Using parameter estimates, I was able to anticipate the way in which parameters for a given independent variable (e.g., provider attributes) related to the log-mean of making one response, relative to another, on that variable (Agresti, 1996). These results have practical applications for training, supervision, mentoring, and self-monitoring. Some differences were remarkable in their extremeness.

Overall, less-experienced providers used FCEI strategies more frequently. One reason to explain this finding could be that less-experienced providers received more up-to-date training. Perhaps the more recently trained providers received more theoretical support and/or more opportunities to practice FCEI strategies in their training programs. Another plausible explanation could be that experienced providers were older and less comfortable with the hardware and Internet platforms associated with telepractice. The demands associated with the use of technology could deflect attention from the use of FCEI behaviors toward a more immediate focus on managing technology.

Some differences between groups were particularly large in that the odds of making one response, relative to another, were more than twice as big. The providers from the field of communication disorders used much more direct instruction than their counterparts trained as teachers of the DHH. For every instance of direct instruction used by teachers of the DHH, providers from the field of communication disorders, on average, used 2.5 times more direct instruction. One explanatory factor may be the coursework included in pre-service training programs. While teachers of the DHH are regularly taught to use DI when teaching children, perhaps they do not learn to use it when teaching adults. As mentioned in Chapter II, teachers of the DHH may not receive coursework or practicum using FCEI practices in their pre-service training (Jones & Ewing, 2002; Luterman & Kurtzer-White, 1999; Meadow-Orlans et al., 2003; Rice & Lenihan, 2005; Roush et al., 1992; Roush et al., 2004).

Another notable difference was that less-experienced providers, as measured in number of years conducting FCEI, used more direct instruction (DI) than their more-experienced counterparts. For every instance of DI used by more-experienced providers, the less-experienced providers used, on average, 2.25 times more DI. These less-experienced providers also used more CBF. For every instance of CBF initiated by the experienced providers, the less-experience professionals used, on average, 3.6 times more CBF. As mentioned previously, the less-experienced providers may have benefitted from more-recent training that emphasized and included practice in the use of FCEI.

For some differences, there was at least a 50% disparity between groups. Some of these notable differences were surprising in that it was the less-experienced providers who used more FCEI behaviors. Providers who delivered FCEI to fewer children

used .50 times more CBF than did their peers who had experience with more children. Providers with less experience using telepractice with children of all ages used almost 2 times more CBF. The less-experienced providers, measured according to use of telepractice with infants and toddlers, used more CBF and more DI. Once again, I considered the effect of more-recent pre-service training on these less-experienced providers. There could also be an effect of professional development training that is offered by an agency. If one considers the clinical application of these findings, one might want the less-experienced providers to pair with their more-experienced colleagues. This could be a consideration in structuring a mentoring program.

The use of parent practice with feedback (PPF) had one notable difference between provider groups. This time, it was the less-experienced providers, according to the number of clients they saw using FCEI, who used less PPF than their more-experienced peers. For every instance of PPF used by the more-experienced providers, the less-experienced counterparts used .50 times less PPF. This distinction for the less-experienced providers deviates from the previously discussed aspects of the model; less-experienced providers generally used more of the FCEI behaviors. Clinically speaking, this finding led me to consider the value of a peer mentoring program wherein less- and more-experienced providers would be paired together. These providers could share their strengths in delivering FCEI while enhancing their weaknesses.

Family-centered Early Intervention Provider Behaviors were Used More in Telepractice

Based on the data from this study, I established the percentage of time each FCEI provider behavior occurred in the telepractice condition. These findings were

contextualized according to existing percentages in the literature; all occurrences in the literature were predicated on F2F therapy. I expected the use of FCEI provider behaviors in telepractice to occur in higher percentages than F2F therapy based on the nature of telepractice. For example, a provider using telepractice is compelled to work with the parent, in part, because the professional does not have hands-on access to the child. My hypothesis held true for three of the four provider behaviors: (a) observation (OB); (b) parent practice with feedback (PPF); and (c) child behavior with provider feedback (CBF).

Observation (OB). The use of OB is an expectation in FCEI practice; the provider observes the parent's skills, the child's performance, and the interaction between parent and child. When using OB, the provider spends less time working directly with the child. This allows the parent to be the primary person interacting with the child. As hypothesized, OB occurred more frequently in the telepractice condition than in F2F therapy sessions. I saw providers actively documenting their observations; some took notes on paper, and one provider took notes on the computer.

The magnitude of the difference was surprising. Observation (OB) in the telepractice condition constituted a mean of 79% of all coded behaviors. This percentage was at least twice the frequency of OB in F2F sessions (Campbell & Sawyer, 2007, 2009; Colyvas et al., 2010; McBride & Peterson, 1997; Peterson et al., 2007). More frequent use of OB in telepractice can be viewed positively. That said, I questioned the magnitude of its use. The range in my data set showed that OB was used 56-100% of the time. Is 56% a more appropriate amount? Is 100% too much? Future studies will need to explore the answers to these questions.

The actual amount OB can be interpreted in light of the coding strategy used. The previous results reflect the percentage of time OB was used as the primary behavior in any 30-second interval. The occurrence of OB changes when all four provider behaviors are counted in *any* position within a 30-second interval. When OB and the other provider behaviors were counted in *any* position in a 30-second interval, OB occurred less frequently. When calculated in this way, the mean was 63% of the four behaviors, and the range changed to 40-93%. Clinically speaking, I found these data to be more acceptable. OB is beneficial; however, it may not be as favorable when used in extreme amounts.

Parent practice with provider feedback (PPF). Parent practice with provider feedback (PPF) is a quintessential benchmark of coaching practice (Olsen et al., 2012). Using this strategy, the provider watches a parent interacting with the child and offers feedback to the parent about the parent's actions. PPF offers suggestions to the parent to promote the parent's use of desired skills to augment the child's development.

As anticipated, PPF occurred more frequently in telepractice than in the F2F condition (McBride & Peterson, 1997; Peterson et al., 2007). The range for the use of PPF in the telepractice condition was 0-10%, with a mean of 3%. At the higher end of the range, PPF was used more frequently than in the F2F study by Colyvas et al. (2010).

The disparity in the use of PPF in telepractice and F2F therapy was even more notable when I coded the use of PPF in *any* position in a 30-second interval. When calculated in this way, the mean use of PPF was 10% of all behaviors; the range was 1-22%. This increased use of PPF in the telepractice condition more closely fulfills the principles of FCEI.

Child behavior with provider feedback (CBF). CBF is strongly endorsed as a participatory-based FCEI strategy (Dunst & Trivette, 2009a, 2009b; Espe-Sherwindt, 2008; Flaherty, 1999; Fleming et al., 2011; Kinlaw, 1999; Peterson et al., 2007; Rush & Shelden, 2005, 2011; Rush et al., 2003; Salisbury et al., 2010; Woods et al., 2011). CBF encompasses many aspects of FCEI practice. When using CBF, the parent interacts with the child, and the provider offers feedback to the parent about the child's behavior during the parent-child interaction (Friedman et al., 2012). The purpose of this technique is to help the parent know when a technique benefits the child. This, in turn, may help the parent to intentionally use the technique and to use it more frequently, which can facilitate good child outcomes (Woods et al., 2011).

CBF was used, on average, for 6.5% of the coded behaviors. The range, when CBF was coded in the predominant position in any 30-second interval, was 0-23%. This exceeds the documented occurrence in the F2F condition in the literature (McBride & Peterson, 1997; Peterson et al., 2007). In these two studies, CBF occurred less than 1% in a session.

Even more encouraging was the use of CBF when it occurred in any position within a 30-second interval. Calculated this way, CBF occurred a mean of 12% of the session; the range increased to 0-31%.

Direct Instruction was Used Less in the Telepractice Condition

DI is described, repeatedly, as an integral part of good coaching practice (Campbell, 2004; Campbell & Sawyer, 2009; Colyvas et al., 2010; Friedman et al., 2012; Knowles et al., 2005; Woods et al., 2011). Using DI, the provider intentionally scaffolds the caregiver's knowledge or capacity for skill mastery by providing print, verbal, and/or

video information on ways to implement a specific strategy (Friedman et al., 2012). Direct instruction can increase a parent's competence and confidence using particular intervention strategies (Woods et al., 2011) by helping the parent to understand why a strategy is important and the ways in which its use can augment the child's development (Campbell, 2004; Friedman et al., 2012). As a consequence of direct instruction, a parent can practice a strategy during the session before being expected to use it independently between visits (Colyvas et al., 2010). This strategy is well suited to telepractice; in telepractice, the provider cannot remotely demonstrate a technique. To account for this, a more in-depth description of the strategy being taught is warranted. It was surprising, then, that DI occurred less frequently in the telepractice condition.

The use of DI accounted, on average, for 12% of the provider behaviors. The range among providers was 0-36%. The mean for the use of DI in the F2F condition was 19% (Colyvas et al., 2010). When accounting for the use of DI in any 30-second interval, even if it was not the predominant behavior in that interval, DI occurred slightly more frequently in this study. The mean was 14%, and the range was 0%-35%.

Limitations

This study included 16 providers. This makes the chance of a Type II error, not finding significance when it was there, more likely. There were several limitations, many of which relate to the sample.

It would have been ideal to have the same number of participants from each participating agency. Had this been the case, the sample would have been more representative of providers nationwide. For this study, trying to obtain an adequate number of participants, with equal numbers from each agency, would have limited the

number of participants. I accepted all participants that were willing to join the study. There were one to four participants from eight different agencies.

An attempt was made to recruit participants who used different communication approaches with their clients. However, all of the providers in this study used auditory-verbal practice. To my knowledge, I contacted all agencies in the United States that were delivering FCEI using telepractice. As mentioned earlier, it seems that agencies using auditory-verbal practice are particularly keen on delivering services via telepractice.

The sample was diverse in that the eight agencies were in different geographic locations nationwide. All programs operated independently. Many programs were not-for-profit. None of the programs operated within a public entity (i.e., a state school for the deaf or a state or county Part C agency). Based on these characteristics, it is more appropriate to generalize the results to similar types of agencies.

To accommodate the small sample size, I was generous in establishing significance levels. I set the α-value at $\leq .05$ for significance. I considered any *p*-values at $\leq .20$ as marginal statistical evidence. I chose to report on non-significant findings when they were interesting or surprising to me, even though the variables were statistically unrelated. All of these findings—those with statistical properties and those of clinical interest—can be applied to a training program for providers using or learning about telepractice.

As I prepared my raw data, I converted continuous variables to categorical variables. In some cases, I collapsed data into categories in order to assure there were data points in every cell. I used my clinical opinion to define categories. These opinions

were described, in detail, in Chapter III and Chapter IV. It is notable that this discretization could cause loss of information and lower power.

Another limitation was the variability among providers related to in-service training. Highest degree earned was one independent variable. I did not account for any in-service training or professional development. Additional training may have been offered to some participants, but not to all providers. Based on organized training, providers from the same agency who received the same training may have behaved more similarly. In future research, it would be valuable to eliminate this effect.

The length of the recordings presented another limitation. Most of the video recordings were approximately 1 hour. Three videos, however, were approximately 30 minutes in length. While this is a concern, especially with the GLM analysis, I proceeded with my analyses, knowing that the intent of my study was to investigate the association among variables. Therefore, the length of the videos was not, in and of itself, a problem.

Another potential limitation was the use of a coding protocol that was unique to this study. I intended to use an existing coding protocol. However, as described in Chapter III, there were several issues that led me to create my own coding instrument. I strived to use provider behaviors that were accounted for in the literature. Measurements of OB and DI were straightforward. Definitions of PPF and CBF varied in the literature. I created definitions that encompassed characteristics from the literature. The choice of a coding instrument should be considered in any future studies.

In future studies, with more participants, I would recommend using more than four provider behaviors. Some provider behaviors occurred regularly, but they were not in my coding protocol. These included: (a) modeling; (b) three-way interaction among

provider, parent, and child; (c) counseling; and (d) general conversation. These additional behaviors are documented in the literature.

Some statistical procedures were well suited to my population. I used Fisher's Exact Test to account for small frequency counts. I did not choose to analyze the interaction among variables in the general linear model because of my small sample size. In future studies, it would be interesting to apply a logistic regression model to investigate the probability an event will occur. This approach would also account for the varying lengths of video recordings. I did not conduct this analysis because the small number of providers would likely have precluded finding significance.

The third research question investigated the percentage of time each FCEI provider behavior occurred in the telepractice condition. These findings were discussed, descriptively, in the context of outcomes documented in the literature when therapy was conducted in the traditional F2F condition (Campbell & Coletti, 2013; Campbell & Sawyer, 2007; Fleming et al., 2011; McBride & Peterson, 1997; Peterson et al., 2007; Ridgley & Snyder, 2010). In the literature, coding was done in 30-second intervals. I did the same in order to make a fair comparison. However, when I coded the videos in this study, I noticed that a variety of behaviors were often used in *any* 30-second interval. The occurrence of two behaviors in any one 30-second interval was common. Occasionally, three or four behaviors occurred in a 30-second interval. In my opinion, coding only the predominant behavior in a 30-second interval underrepresents the diversity of providers' use of FCEI behaviors. I strongly encourage coders in future studies to document *all* predetermined behaviors that occur in *every* 30-second interval.

Implications and Future Research

When I initiated this study, my intent was to examine any differences in the delivery of FCEI that might occur when intervention was delivered via telepractice. The findings in my study showed there were differences in the use of FCEI provider behaviors when therapy was conducted in telepractice. This information was encouraging for several reasons: (a) the use of telepractice is expanding; (b) use of FCEI strategies is mandated by law; and (c) funding for telepractice is uncertain because there is little documentation of its effects.

Providers delivering FCEI to parents of infants and toddlers are using telepractice in small numbers. But, these numbers are expanding. Eight agencies participated in my study. In order to recruit 16 participants, I contacted more than 20 agencies that were delivering FCEI via telepractice. These 20 agencies were all providing telepractice to parents of infants and toddlers who were DHH. I am sure there are many more agencies providing FCEI via telepractice to children with other types of disabilities (Cason et al., 2012; Larney et al., 2014; Law, 2014; Peacock, 2014).

Family-centered early intervention (FCEI) practices may be hard to do (Campbell et al., 2009; Colyvas et al., 2010; Crais et al., 2006; Dunst et al., 1991; Fleming et al., 2011; Sheridan et al., 2009), but the law requires providers to use them (IDEA, 1990, 1997, 2004). The benefits of FCEI have been justified (Dunst & Trivette, 2009a; Dunst et al., 2006, 2007, 2008; Judge, 1997; King et al., 1999; Thompson et al., 1997). It is encouraging that telepractice may, unwittingly, support the use of FCEI practices. This was not the intent of telepractice. However, a by-product of this increasingly accessible

service delivery platform may be that parents receive the type of therapy that has been found to support successful outcomes for children.

Telepractice is funded unevenly throughout the United States. Some insurance companies pay for telepractice, but many do not (Brannon & Brown, 2012; Romanow & Brannon, 2010). Some state Medicaid programs fund therapy delivered via telepractice, and some do not (Blaiser et al., 2012; Brown, 2009; D. Sorkin, personal communication, January 4, 2010; J. Brown, personal communication, January 26, 2010; Romanow & Brannon, 2010; Stith et al., 2012; T. Dyson, personal communication, October 23, 2014). Likewise, only some State Part C programs will pay for therapy delivered via telepractice (Cason et al., 2012). If it can be shown that FCEI is conducted as well, if not more robustly, when it is delivered via telepractice, then funding agencies may be more willing to support it.

Conclusions

The intent of this study was to investigate any impact telepractice might have on providers' utilization of FCEI provider behaviors. This study was based on the premise that telepractice may, incidentally, enhance providers' use of FCEI. The results were encouraging. Some of the provider behaviors that were studied were used more frequently in telepractice than in traditional face-to-face therapy. Furthermore, some specific provider attributes were associated with increased use of FCEI behaviors.

The findings from this study may now serve to advance the use of telepractice. As it is, some administrators of programs that work with infants and toddlers who are DHH have reported on the cost benefit of telepractice (Davis et al., 2012) as well as provider and/or parent satisfaction (Blaiser et al., 2012; Broekelmann, 2012; Davis et al.,

2012; Peters-Lalios, 2012; Simmons, 2012; Stith et al., 2012). Knowing that telepractice is also an effective way to enhance implementation of FCEI, program administrators, policymakers, and funders may be more likely to endorse it.

I first considered this service delivery platform almost 15 years ago. At that time, my support for telepractice was based on my goal to deliver equitably high-quality therapy to children living in urban, remote, or rural geographic locations. Based on my study, my goal is now more expansive. I still support telepractice as a way to deliver uniformly high-quality services to children living in different geographic locations. In addition, though, it seems that telepractice may provide the medium for enhancing the implementation of family-centered early intervention. This is exciting. Professional organizations may acquire the information that is needed to support a professional stance on telepractice use, and county, state, and/or federal agencies may move forward on the establishment of policies defining the use of and reimbursement for telepractice in the 21st Century.

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APPENDIX A

FAMILY-CENTERED EARLY INTERVENTION PROVIDER DEMOGRAPHIC FORM

Family-centered Early Intervention Provider
Demographic Form

Provider Name: _____

Agency Name: _____

Today's Date: _____

1. **Education Level** (Check the highest degree you have attained):
   - ☐ High school diploma
   - ☐ AA degree
   - ☐ BA (or equivalent) degree
   - ☐ MA degree
   - ☐ AuD degree
   - ☐ EdD degree
   - ☐ PhD degree

2. **Certification**
   - ☐ LSLS – Cert AVT
   - ☐ LSLS – Cert AVEd
   - ☐ Other certificate (Describe): _____

3. **Pre-service Training** (Identify each discipline that resulted in a conferred degree; identify the degree associated with that discipline)**:**

Discipline	BA	MA	PhD
Audiology			
Early Childhood			
Early Childhood Special Education			
Speech-Language Pathology			
Teacher of the Deaf/Hard of Hearing			

4. **Identify the number of years you have delivered family-centered early intervention:**

☐ 0-1 years	☐ 12-14 years
☐ 1-2 years	☐ 14-16 years
☐ 2-3 years	☐ 16-18 years
☐ 3-4 years	☐ 18-20 years
☐ 4-5 years	☐ 20-22 years
☐ 5-6 years	☐ 22-24 years
☐ 6-7 years	☐ 24-26 years
☐ 7-8 years	☐ 26-28 years
☐ 8-9 years	☐ 28-30 years
☐ 9-10 years	☐ 30-32 years
☐ 10-12 years	☐ 32+ years

5. **Estimate the number of children, birth to 36 months of age, you have worked with during your career (This does not include children seen during your practicum or internship experiences during your pre-service training.)**

☐ < 5 children

☐ 6-10 children

☐ 11-15 children

☐ 16 -20 children

☐ 21-30 children

☐ 31-40 children

☐ > 40 children

6. **Estimate the number of sessions you have conducted with *children of any age using telepractice* during your career (This does not include children seen during your practicum or internship experiences during your pre-service training.)**

   ☐ < 5 sessions

   ☐ 6-10 sessions

   ☐ 11-15 sessions

   ☐ 16 -20 sessions

   ☐ 21-30 sessions

   ☐ 31-40 children

   ☐ > 40 sessions

7. **Estimate the number of sessions you have conducted with *infants and toddlers, birth to 36 months of age, using telepractice* during your career (This does not include children seen during your practicum or internship experiences during your pre-service training.)**

   ☐ < 5 sessions

   ☐ 6-10 sessions

   ☐ 11-15 sessions

   ☐ 16 -20 sessions

   ☐ 21-30 sessions

   ☐ 31-40 children

   ☐ > 40 sessions

APPENDIX B

RECORDING FORM FOR VIDEOTAPES OF EARLY INTERVENTION FAMILY VISITS: PROVIDERS TEACHING PARENTS

RECORDING FORM

VIDEOS OF EARLY INTERVENTION FAMILY-CENTERED SESSIONS:
PROVIDERS TEACHING PARENTS

PROVIDER ID: _____ PROVIDER DISCIPLINE: _____

RATER: _____ DATE RATED: _____

Total length of tape in minutes: _____ Number of minutes coded: _____

LOG OF PROVIDER FCEI EVENTS:

INTERVAL
Intervals are of 30-second duration (0-0.5 min, 0.5-1.0 min, etc).
Begin recording intervals when home visit starts.

TECHNICAL PROBLEM
Check this box if unable to see and/or hear what is happening in the interval.

HV ROLE
OB – observing
DI – direct instruction
PPF – parent practice with feedback
CBF – child behavior with provider feedback

INTERVAL	TECHNICAL PROBLEM	HV ROLE				COMMENTS
		OB	DI	PPF	CBF	
0.0-0.5						
0.5-1.0						
1.0-1.5						
1.5-2.0						
2.0-2.5						
2.5-3.0						
3.0-3.5						
3.5-4.0						
4.0-4.5						
4.5-5.0						
5.0-5.5						
5.5-6.0						
6.0-6.5						
6.5-7.0						
7.0-7.5						
7.5-8.0						
8.0-8.5						
8.5-9.0						
9.0-9.5						
9.5-10.0						

INTERVAL	TECHNICAL PROBLEM	HV ROLE				COMMENTS
		OB	DI	PPF	CBF	
10.0-10.5						
10.5-11.0						
11.0-11.5						
11.5-12.0						
12.0-12.5						
12.5-13.0						
13.0-13.5						
13.5-14.0						
14.0-14.5						
14.5-15.0						
15.0-15.5						
15.5-16.0						
16.0-16.5						
16.5-17.0						
17.0-17.5						
17.5-18.0						
18.0-18.5						
18.5-19.0						
19.0-19.5						
19.5-20.0						
20.0-20.5						
20.5-21.0						
21.0-21.5						
21.5-22.0						
22.0-22.5						
22.5-23.0						
23.0-23.5						
23.5-24.0						
24.0-24.5						
24.5-25.0						
25.0-25.5						
25.5-26.0						
26.0-26.5						
26.5-27.0						
27.0-27.5						
27.5-28.0						
28.0-28.5						
28.5-29.0						
29.029.5						
29.5-30.0						
30.0-30.5						
30.5-31.0						
31.0-31.5						
31.5-32.0						

INTERVAL	TECHNICAL PROBLEM	HV ROLE				COMMENTS
		OB	DI	PPF	CBF	
32.0-32.5						
32.5-33.0						
33.0-33.5						
33.5-34.0						
34.0-34.5						
34.5-35.0						
35.0-35.5						
35.5-36.0						
36.0-36.5						
36.5-37.0						
37.0-37.5						
37.5-38.0						
38.0-38.5						
38.5-39.0						
39.0-39.5						
39.5-40.0						
40.0-40.5						
40.5-41.0						
41.0-41.5						
41.5-42.0						
42.0-42.5						
42.5-43.0						
43.0-43.5						
43.5-44.0						
44.0-44.5						
44.5-45.0						
45.0-45.5						
45.5-46.0						
46.0-46.5						
46.5-47.0						
47.0-47.5						
47.5-48.0						
48.0-48.5						
48.5-49.0						
49.0-49.5						
49.5-50.0						
50.0-50.5						
50.5-51.0						
51.0-51.5						
51.5-52.0						
52.0-52.5						
52.5-53.0						
53.0-53.5						

INTERVAL	TECHNICAL PROBLEM	HV ROLE				COMMENTS
		OB	DI	PPF	CBF	
53.5-54.0						
54.0-54.5						
54.5-55.0						
55.0-55.5						
55.5-56.0						
56.0-56.5						
56.5-57.0						
57.0-57.5						
57.5-58.0						
58.0-58.5						
58.5-59.0						
59.0-59.5						
59.5-60.0						

APPENDIX C

INSTITUTIONAL REVIEW BOARD COVER SHEET

Research Involving Human Participants Coversheet for UNC IRB Application

Important note: **You must use Adobe Acrobat to complete this form**. Do not use Preview (the default Mac OS X application for displaying PDF documents). There is a compatibility problem, and PDF forms filled out in Preview do not display the form data when opened in Acrobat. If you choose not to use Acrobat, you will likely encounter a delay in processing of your IRB application.

If you do not have Acrobat Reader, click on this button to download a free copy: Get ADOBE READER

Project Title: Examination of Early Intervention Delivered Via Telepractice with Deaf/Hard of Hearing

Contact Information (reviewers will communicate via IRBNet)

Principal Investigator: Arlene Stredler Brown Phone #: 303-818-1258

School/Department: EBS/Special Education UNC e-mail: brow5784@bears.unco.edu

Research Advisor: Sandy Bowen UNC e-mail: Sandy.bowen@unco.edu
(*required for students*)

CERTIFICATION OF PRINCIPAL INVESTIGATOR (PI)

I certify that this application accurately reflects the proposed research and that I and all researchers who will have contact with the participants or access to the data have reviewed this application and the Guidelines of the UNC IRB, and will comply with the letter and spirit of these policies. I understand that any changes in procedure which affect participants must be submitted to the IRB (using the Request for Change in Protocol Form) for written approval prior to their implementation. I further understand that any adverse events and significant changes in risk for participants must be immediately reported in writing to the UNC IRB.

The signature of the PI must be completed on IRBNet.

CERTIFICATION OF RESEARCH ADVISOR

I certify that I have thoroughly reviewed this application, confirm its accuracy, and accept responsibility for monitoring the conduct of this research, the maintenance of any consent documents as required by the IRB; and, in the case of expedited reviews, the continuation review of this project in approximately one year.

The signature of the Research Advisor (if applicable) must be completed on IRBNet.

Summary Information (to be completed by the Lead Investigator)

Review Category: ☐ Exempt (2-3 weeks) ☑ Expedited (3-4 weeks) ☐ Full-Board (4-6 weeks)

Research participants will be: (e.g., adults, elderly, children, healthy, unhealthy, etc.): Adults (therapist, parent) and children birth - 36 months

Type of data collected will be: (e.g., survey responses, interviews, blood samples, existing data, etc.): Existing digitally-recorded videos

Location of collected data: The data will be stored by the researcher in a locked file cabinet in her UNC office or stored on a personal computer secured by a password to which only the researcher and her advisor will have access.

Is standard consent documentation used: ☑ YES ☐ NO If NO, you must be addressed within application.

Is permission required (e.g., school district)? ☑ YES ☐ NO If YES, you must include letter (this is not consent).

Is this a funded research project? ☐ YES ☑ NO If YES, you must provide source within application.

2.22.13

Clear the Form

APPENDIX D

AMENDED/APPROVED NARRATIVE

Narrative: UNC IRB Application

Title: Early Intervention Delivered Via Telepractice

A. Purpose

1. The Individuals with Disabilities Education Act (IDEA) (1990, 1997, 2004) assures children with disabilities, and their parents, receive appropriate intervention. A particular type of therapeutic intervention is offered to very young children from the time of diagnosis until the third birthday; these services are addressed in Part C of IDEA and referred to as family-centered early intervention (FCEI). Researchers and practitioners include these behaviors in a family-centered early intervention model: (a) a child's parents are actively involved in the intervention; (b) a family's needs and desires determine service delivery; (c) professionals are agents of family members; (d) professionals intervene in ways that maximally promote family members' roles in decision-making; and (e) professionals work to identify and enhance each family members' capabilities and competencies (Brewer et al., 1989; Dunst, 2006; Dunst et al., 2002; Dunst et al., 1991; McBride et al., 1993; Powell, 1996; Trivette & Dunst, 2006). Children with qualifying disabilities are eligible to receive, indeed are supposed to be given, FCEI. Evidence shows, however, that FCEI therapy sessions often do not incorporate FCEI provider behaviors (Campbell & Sawyer, 2007; Hebbeler et al., 2008; Peterson et al., 2007).

   I will investigate the use of FCEI provider behaviors with children who are deaf or hearing (DHH) receiving therapeutic interventions via telepractice. Telepractice is "the application of telecommunications technology to deliver professional services at a distance by linking clinician to client…for assessment, intervention, and/or consultation" (ASHA, 2005b, para. 1). Many researchers, program administrators, and FCEI practitioners anticipate that the use of FCEI practices will be enhanced through telepractice (Blaiser et al., 2012; Broekelmann, 2012; Davis et al., 2012; Hamren & Quigley, 2012; Hopkins et al., 2012; Houston & Behl, 2012; McCarthy, 2012; Olsen et al., 2012; Peters-Lalios, 2012). Telepractice, by its very nature, promotes active parental involvement in an early intervention treatment session. I will investigate and report on the frequency with which providers use specific FCEI behaviors in the telepractice condition.

   I have several reasons supporting my investigation. One reason relates to the benefits of FCEI. Legislation mandates the practice of FCEI strategies (IDEA, 1990, 1997, 2004). And, use of FCEI strategies has a positive effect on child outcomes (Dunst & Trivette, 2009). The other reason focuses on telepractice. Telepractice has the potential to provide more equitable services to children living in remote or rural communities. And, professional organizations are starting to investigate the use of telepractice.

   The purpose of this quantitative study is to investigate the potential relationships among provider attributes (i.e., professional discipline, amount of education,

amount of experience) and the use of FCEI provider behaviors by these professionals. There is little empirical research on the effectiveness of telepractice with infants and toddlers who are DHH. There are reports of satisfaction (Blaiser et al., 2012; Broekelmann, 2012; Davis et al., 2012; Hamren & Quigley, 2012; Hopkins et al., 2012; Houston & Behl, 2012; McCarthy, 2012; Peters-Lalios, 2012). And, there are testimonials attesting to increased use of FCEI provider behaviors (Blaiser et al., 2012; Broekelman, 2012; Davis et al., 2012; Hamren & Quigley, 2012; Hopkins et al., 2012; Houston & Behl, 2012; McCarthy, 2012; Peters-Lalios, 2012). The outcomes of my study may contribute to the emerging body of evidence demonstrating the use of FCEI provider behaviors when therapy is delivered via telepractice.

If the telepractice service delivery platform increases the use of FCEI provider behaviors, use of telepractice may garner more interest as an alternative service delivery platform. If the telepractice service delivery platform increases the use of FCEI provider behaviors, the findings may add momentum to the emerging acceptance of telepractice. More programs may opt to offer services via telepractice. Professional organizations may acquire the information that is needed to support a professional stance on telepractice use. And, federal agencies may move forward on the establishment of policies defining the use of and reimbursement for telepractice in the 21st Century.

My research questions are:

Q1 Is there a relationship between provider attributes (IV) and FCEI provider behaviors (DV)?

Q2 What is the nature of any statistically significant relationship between provider attributes and FCEI provider behaviors?

Q3 How often do the FCEI provider behaviors occur in the telepractice condition in contrast to the frequency of each behavior as it occurs in the F2F condition reported in the literature?

2. This study conducts involves data derived from human participants. The characteristics of the study fall into the expedited category. My research involves the collection or study of existing data in the form of digitally-recorded videos of family-centered therapy. In some instances, the videos will be captured and archived before the start of my study as part of previously established therapeutic procedures. I will also accept videos that are digitally recorded after the start of my study. In all cases, the digital recordings are part of the existing standard of care.

   This research study includes therapists (aka; providers) and the parents of children who are DHH. The children, age 36 months and younger, are captured on the digitally-recorded videos. The behaviors of the children, however, will not be evaluated.

Because the material being collected is in the form of digitally-recorded videos, the study fits the characteristics of an expedited study. Note, however, that the recordings are *not* made for research purposes. And, as a researcher, I will *not* participate in the activities being observed.

I will also collect demographic information about the providers. All personal identifiers will be coded to maintain anonymity of these providers and there will be no identifiable links to the participants.

B. Methods

1. Participants

Participants will be providers delivering FCEI. Providers must work, at the time of data collection or in the recent past, with infants and toddlers who are birth to 36 months of age and are deaf or hard of hearing (DHH). All participants will have been, or will be, delivering FCEI in the telepractice condition. Providers for my study can be experienced or novices.

The provider, the child, and at least one parent will be included in each digitally-recorded session. I will accept any recorded telepractice sessions; these sessions may have been conducted and archived before I approach the agency about my study.

I will contact administrators and/or program administrators of agencies that are providing FCEI via telepractice to children birth to 36 months who are DHH. I will engage participants working in different programs. This will facilitate recruitment and foster a representative sample of providers nationwide. The nine sites of interest are listed in alphabetical order: (a) Center for the Acquisition of Spoken Language Through Listening Enrichment (CASTLE) at the University of North Carolina in Chapel Hill, North Carolina; (b) Center for Communication, Hearing, and Deafness in West Allis, Wisconsin; (c) Clarke School for Hearing and Speech in Northampton, Massachusetts; (d) Governor Baxter School for the Deaf in Falmouth, Maine; (e) Hearts for Hearing in Oklahoma City, Oklahoma; (f) iHear in St. Louis, Missouri; (g) Jean Weingarten Peninsula Oral School in Redwood City, California; (h) Listen and Talk in Seattle, Washington; ~~and~~ (i) Soundbridge in Wethersfield, Connecticut; and (j) The Moog Center for Deaf Education in St. Louis, MO.

My initial contact will be with the administrator of these programs. I will make my initial contact either in person or through e-mail. I will share the intent of my study. The content in my initial e-mail is in Appendix A. I will provide additional oral and written information about my study to the agency or program administrator upon request.

I plan to have a minimum of ten participants and hope to have 20 or more. When an agency or program administrator is interested in my study, I will ask the

administrator to identify providers within the agency who have delivered and/or are currently offering FCEI via telepractice. In this way, participants will represent a convenience sample.

I would like to have a minimum of one participant from each center. In this way, I can obtain a diverse group of participants who will vary according to geographic location, type of center (i.e., not-for-profit, state supported, or university affiliated), and/or communication approach (i.e., listening and spoken language, sign language, a combination of spoken and sign language). I will randomly select participants from the sites that agree to be in my study.

I will obtain signed letters of permission from each agency or program administrator participating in my study. The letter of permission is in Appendix B. Consent will be collected from each provider. This consent will be sent via e-mail to the agency or program administrator who will deliver it to the provider. The consent form is in Appendix C. Consent will also be obtained from the parents recorded on the videos. This form will also be sent to the agency or program administrator who will deliver the form to the parent. The parent consent form is in Appendix D.

All children will be 36 months of age or younger. All children will be DHH. English will be the primary language spoken in the family's home. Assent will not be necessary. All of the sessions will have been digitally-recorded, therefore, there will be no need to consider the behaviors of the child during the session in order to determine assent.

2. Data Collection Procedures

The agency or program administrator will identify the providers who meet eligibility criteria. Eligibility criteria include: (a) participants provide FCEI to infants and toddlers who are DHH; (b) FCEI therapy sessions are conducted in the telepractice condition; and (c) the telepractice session is digitally-recorded.

If the agency or program administrator is interested in my study, I will ask the administrator to identify at least one provider within the agency who has provided and/or is currently offering FCEI via telepractice. I will ask the agency or program administrator to select providers who have recorded, or will have the opportunity to record, one session with a client.

I have developed a questionnaire to collect information describing the attributes of providers. This questionnaire is in Appendix E. The questionnaire will be sent to each provider via e-mail. I will approach this task in stages. First, I will send an e-mail notifying the participants that a questionnaire will be sent in a subsequent e-mail. Then, I will send the e-mail with the questionnaire attached. I will contact each participant upon receipt of his or her completed questionnaire to offer my thanks and appreciation. If the questionnaire is not returned, I will send another e-mail reminding the participant to complete it.

Copies of the digitally-recorded video sessions will be sent to me when privacy and security concerns allow. The way in which this is done will depend, in large part, on the method chosen by the agency personnel. Dropbox and Screencast are two secure platforms designed for sharing videos. If agency personnel do not want to transfer data, I will analyze the recorded sessions on-site at the agency's office. Irrespective of the approach that is used, no videos will be stored on my hard drive. All recorded sessions will be logged with coded numbers to maintain anonymity of the agency, the provider, the child's parents, and the child.

3. Data Analysis Procedures

A telepractice session conducted by the provider will be digitally-recorded. Both the provider and the parent will be captured on each recording. There may be times when the child, though present, is out of view. This will not be a limitation because my study will collect data related only to *provider* behaviors and all of the provider behaviors I have selected are directed to the parent.

I will measure FCEI provider behaviors through observational methods. I have developed a measurement instrument based on the literature (Basu et al., 2010; Campbell & Coletti, 2013; Campbell & Sawyer, 2007; Colyvas et al., 2010; Fleming et al., 2011; Friedman et al., 2012; McBride & Peterson, 1997; Peterson et al., 2007; Woods et al., 2011). This measurement instrument is in Appendix F.

I will code all of the videos. I will watch each video recording in its entirety or until 60 minutes of the session has elapsed. Coding will commence at the start of the session to access all FCEI provider behaviors. This procedure was used and approved in other studies (Campbell & Coletti, 2013; Campbell & Sawyer, 2007, 2009; Colyvas et al., 2010).

I will collect frequency counts of the four FCEI provider behaviors identified as dependent variables in this study. Videos will be coded at 30-second intervals. If there is more than one behavior in a 30-second interval, the behavior with the longest duration will be highlighted so that future analyses can account for more than one behavior per interval.

All data will be uploaded to SPSS (version 21.0). Descriptive data analyses will be conducted first. Then, I will prepare contingency tables to present frequencies of provider attributes and provider behaviors in order to prepare the data to answer research questions one and two. As appropriate, I will conduct a chi-squared test of independence to investigate the relationship among different variables. If the data are too complex for multiple 2x2 contingency tables, I will use a log linear count model.

A different approach will be taken to answer the third research question. The third research question is an examination of the four identified FCEI provider behaviors used in both the telepractice and F2F conditions. I will discuss how often these behaviors are used in telepractice, how often they are used in the F2F

condition as stated in the literature (Campbell & Sawyer, 2007, 2009; Colyvas et al., 2010; McBride & Peterson, 1997; Peterson et al., 2007), and any differences in use between the two conditions. Statistically, I may be able to establish a confidence interval using my data. Then, I can see if the percentages of the same provider behaviors from the published studies (Campbell & Sawyer, 2007, 2009; Colyvas et al., 2010; McBride & Peterson, 1997; Peterson et al., 2007) fall into the established range.

4. Data Handling Procedures

The privacy of the participants will be protected and their names will not be used in any manner. The researcher, and her research advisor, has been trained in her responsibilities concerning the protection of participants' rights to confidentiality. All recorded sessions will be logged with coded numbers to maintain anonymity of the agency, the provider, the child's parents, and the child.

The researcher will store all demographic information about providers in a locked file cabinet in her UNC office with access limited to the researcher and her research advisor. The digitally-recorded videos will be stored on a secure site (i.e., Dropbox, Screencast). These videos will be accessed via the researcher's personal computer that is secured by a password. Only the researcher and her advisor have access to this computer.

The identity of each participant will be kept confidential by assigning numeric codes to each participant. The results will be coded and the subjects' identifying information will be removed prior to data analysis and will not be included in any publications. A key of participant's names and the codes assigned to those names will be maintained in a separate locked cabinet. Only the researcher and her research advisor will have access to it.

The raw data and all statistical results will be entered into password-protected computers in the UNC research lab and in the researcher's office. The computers in the research lab are password protected and only the researcher and her research advisor will have access.

Once the study has ended, all records will be destroyed. One exception, however, is the handling of consent forms. The researcher is a student. Therefore, her research advisor will retain the consent forms for three years at which time all forms will be deleted, shredded, and/or disposed. Digital data will be purged from my personal computer and the secure site.

The names of the children on the digitally-recorded videos will never be mentioned, reported, or recorded. The activities of the children will not be analyzed. Parents' names will not be mentioned, reported, or recorded. Only the provider behaviors, in the context of interactions with the parent, will be reviewed, coded, and analyzed.

C. Risks, Discomforts and Benefits

There is no more than minimal risk to participants and appropriate informed consent procedures will be instituted. The probability and magnitude of harm or discomfort anticipated in the research are not greater in and of themselves than those ordinarily encountered in daily life or during the performance of routine therapy sessions. Digitally-recorded videos of therapy sessions conducted via telepractice are the current standard of care at each agency participating in this study. Digitally-recorded therapy sessions that have already been conducted will be collected and analyzed. Recordings of therapy sessions will not be made solely for the purpose of the study.

The therapy is primarily of a consultative nature, with therapists interacting with each child's parent. There is an extremely small likelihood, never previously reported with the use of telepractice for this population, that the therapy could not be provided effectively via interactive video. This is not of concern to this study as all participants have already engaged parents in telepractice before and apart from my study. There is no risk to the parents in relation to their involvement in what is essentially a Skype call.

Any risk of violations of confidentiality and privacy are minimized because the researcher and her research advisor have completed CiTi (Collaborative Institutional Training Initiative) training about their responsibilities in protecting participants' rights to confidentiality. Documentation of the researcher's CiTi training is attached to the IRB application. All names and identifying information from questionnaires will be removed. A key will be maintained linking the names and identifying information with the subject numbers. This key will be stored in a separate location from the data with subject number information to ensure further protection.

The participants themselves do not stand to benefit directly from their participation. However, there may be indirect benefits to the discipline. This research study represents an opportunity to address the possibility that the use of family-centered provider behaviors is facilitated when therapy is conducted via telepractice. There is evidence that providers tend not to use recommended FCEI behaviors in the customary F2F condition. I will empirically study the potential influence of telepractice on providers' use of FCEI behaviors. The results of this study may inform practice with young children who are DHH, with young children with other types of disabilities, and/or with older children who are DHH.

D. Costs and Compensations: There are no compensations to providers or the agencies in which the providers are employed. No compensation will be offered to the families whose therapy sessions were digitally recorded.

The only potential cost is to the researcher. If agency personnel do not want to transfer digitally-recorded therapy sessions, I will travel to the site where the recordings are stored. I will assume this expense in its entirety.

APPENDIX E

INVITATION TO DIRECTORS

Initial E-mail to Program or Agency Directors

Dear _____; I am currently working on a project related to the use of telepractice when providing early intervention to infants and toddlers who are deaf or hard of hearing. With your help, I will be able to describe provider behaviors when therapy is conducted via telepractice. I would like to invite you to participate in this project. Your participation would require you to approach providers in your agency who are, or who have been, delivering early intervention via telepractice. I would ask you to identify these providers. I would also request that you ask the parent who received therapy via telepractice for their consent.

Would you respond to this e-mail in order to tell me if you would be willing to participate in this project? If you are, we can make plans to move forward.

Arlene Stredler Brown, CCC-SLP
Doctoral Fellow, National Leadership Consortium on Sensory Disabilities (NLCSD)

APPENDIX F

AGENCY PERMISSION FORM

UNIVERSITY *of*

NORTHERN COLORADO

School of Special Education

Date
Agency or Program Administrator
Name of Agency or Program
Address

RE: Permission to Conduct Research Study

Dear _____:

I am writing to request permission to conduct a research study including providers working in your program. I am currently enrolled in the College of Education and Behavioral Sciences at the University of Northern Colorado (UNC) in Greeley, CO. I am in the process of writing my doctoral dissertation. My study is entitled Examination of Early Intervention Delivered Via Telepractice with Families of Children Who are Deaf or Hard of Hearing.

I hope that your program's administration will allow me to recruit at least one provider delivering family-centered early intervention from your program. Each participant will complete a short questionnaire describing characteristics of their professional background and experience. A copy of this questionnaire is enclosed. In addition, I will ask for access to digitally-recorded videos of three therapy sessions conducted by the provider with a parent of a child who is deaf or hard of hearing. The child must be between birth and 36 months of age. Interested providers, who volunteer to participate, will be given a consent form to sign. Parents who volunteer to have their digitally-recorded sessions included in this study will also be given consent forms to sign. Both signed consent forms will need to be returned to me at the beginning of the study. Copies of these consent forms are attached.

If your approval is granted, I will ask you to identify providers who have recorded, or will have the opportunity to record, one therapy session with a client. Copies of the

digitally-recorded video sessions will be sent to me in accordance with your agency's privacy and security rules. The way in which this is done will depend, in large part, on the method you choose. Dropbox and Screencast are two secure platforms designed for sharing videos. If you do not choose to transfer the digitally-recorded videos, I will analyze the recorded sessions on-site at your agency. Irrespective of the approach that is used, no videos will be stored on my hard drive. All recorded sessions will be logged with coded numbers to maintain anonymity of the agency, the provider, the child's parents, and the child.

The privacy of the providers and the parents will be protected and their names will not be used in any manner. The identity of each provider will be kept confidential by assigning numeric codes to each participant. All digitally-recorded video sessions will be logged with coded numbers to maintain anonymity of the agency, the provider, the child's parents, and the child. The results will be coded and the subjects' identifying information will be removed prior to data analysis and will not be included in any publications. Once the study has ended, all records will be destroyed with the exception of the consent forms. My research advisor will retain these for three years at which time all forms will be deleted, shredded, and/or disposed. Digitally-recorded videos will be purged from the secure site.

The names of the children on the digitally-recorded videos will never be mentioned, reported, or recorded. The activities of the children will not be analyzed. Parents' names will not be mentioned, reported, or recorded. Only the provider behaviors, in the context of interactions with the parent, will be reviewed, coded, and analyzed.

No costs will be incurred by your agency, your program, or the individual participants.

Your approval to conduct this study will be greatly appreciated. I will follow up with a telephone call next week and would be happy to answer any questions or concerns that you may have. You may contact me at my email address: arlene.brown@colorado.edu.

If you agree, kindly sign below and return the signed permission form in the enclosed self-addressed envelope. Alternatively, you may submit a signed letter of permission on your institution's letterhead acknowledging your consent and permission for me to conduct this study at your agency.

Most sincerely,

Arlene Stredler Brown, CCC-SLP
Doctoral Fellow, University of Northern Colorado

Enclosures (Consent of Provider, Consent of Parent)

Approved by:

_____ _____ _____

Print your name and title here Signature Date

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http://www.unco.edu/cebs/sped/

APPENDIX G

PROVIDER CONSENT

UNIVERSITY *of*

NORTHERN COLORADO

School of Special Education

Date

Name of Provider
Name of Agency or Program
Address

RE: Consent to Participate in a Research Study

Dear _____;

You are being asked to participate in a research study. This form provides you with information about the study. I will be available to describe this study to you and to answer all of your questions. Please read the information below and ask questions about anything you don't understand before deciding if you want to participate.

Why is this study being done?

This study plans to learn more about your use of telepractice as a means of providing family-centered early intervention (FCEI) to children, birth to 36 months of age, who are deaf or hard of hearing (DHH). There are only a few providers in the country providing FCEI via telepractice. But, the use of telepractice is quickly emerging as a practical alternative for providing intervention.

I am conducting this research to see if providers of FCEI via telepractice use the same behaviors employed when FCEI is provided in person. You are being asked to be in this research study because you are working with young children who are DHH via telepractice. It is entirely your choice whether or not you choose to participate in this study. Up to 20 providers working with young children who are DHH will

participate in the study.

What happens if I join this study?

If you join the study, you will be asked to complete a short questionnaire describing characteristics of your professional training and experience. In addition, I will ask for access to digitally-recorded videos of one therapy session conducted by you with a parent of a child who is DHH. The child must be between birth and 36 months of age. I will ask you to provide access to one therapy sessions with one client.

What are the possible discomforts or risks?

There are no perceived or foreseeable risks associated with this study that go beyond the normal clinical setting. Digitally-recording of therapy sessions conducted via telepractice is the current standard of care. Digitally-recorded therapy sessions that have already been conducted will be collected and analyzed. Recordings of therapy sessions will not be made solely for the purpose of the study.

The principal risk to you is that personally sensitive information that you provide may not be kept confidential. This risk will be minimized because I have been trained in my responsibilities concerning the protection of participants' rights to confidentiality. I will remove names and identifying information from all research protocols.

Any other risks are unknown and unforeseeable at this time.

What are the possible benefits of the study?

There are no direct benefits to you for participating in the study. This study is designed for me to learn more about the use of telepractice when providing FCEI to families. However, there may be indirect benefits to the discipline. The findings may add momentum to the emerging acceptance of telepractice. More programs may opt to offer services via telepractice. The results of this study may inform practice with young children who are DHH, with young children with other types of disabilities, and with older children who are DHH. Professional organizations may acquire the information that is needed to support a professional stance on telepractice use. And, state agencies may move forward with the establishment of policies defining the use of and reimbursement for telepractice.

Will I be paid for being in the study? Will I have to pay for anything?

You will not be paid to participate in this study. Nor will it cost you anything to be in the study.

Is my participation voluntary?

Taking part in this study is voluntary. You have the right to choose not to take part in this study. If you choose to take part, you have the right to stop at any time. If you refuse or decide to withdraw later, you will not lose any benefits or rights to which you are entitled.

Who do I call if I have questions?

I am the primary researcher for this study. You may ask any questions you have now. If you have questions later, you may call me at (303) 818-1258. My e-mail address is: arlene.brown@colorado.edu. You may also contact my co-research advisor, Dr. Sandy Bowen, at 970-351-2102. Dr. Bowen's e-mail address is: sandy.bowen@unco.edu.

You may have questions about your rights as a participant in this study. You can call either me or Dr. Bowen with your questions.

Who will see my research information?

The University of Northern Colorado has rules to protect information about you. Federal and state laws including the Health Insurance Portability and Accountability Act (HIPAA) also protect your privacy. This part of the consent form tells you what information about you may be collected in this study and who might see or use it.

Your identity will be kept confidential. I will assign numeric codes to identify you and the parent on the video. The results will be coded and all participants' identifying information will be removed prior to data analysis and will not be included in any publications. A key of participant's names and the codes assigned to those names will be maintained in a separate locked cabinet. Only my research advisor and I will have access to it. I will see, use and disclose your information only as described in this form. I will do everything I can to keep your records confidential. This, however, cannot be guaranteed.

Agreement to be in this study

I have read this consent form about the study. I understand the possible risks and benefits of this study. I know that being in this study is voluntary. I choose to be in this study. I will get a copy of this consent form.

Signature: _____

Date: _____

Print name: _____

Consent form explained by: _____

Date: _____

Print name: _____

Investigator: _____

Date: _____

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APPENDIX H

PARENT CONSENT

UNIVERSITY *of*

NORTHERN COLORADO

School of Special Education

Date

Name of Parent
Address

RE: Consent to Participate in a Research Study

Dear _____;

You are being asked to participate in a research study. This form provides you with information about the study. I will be available to describe this study to you and to answer all of your questions. Please read the information below and ask questions about anything you don't understand before deciding if you want to participate.

Why is this study being done?

This study plans to learn more about your provider's use of telepractice as a means of providing family-centered early intervention (FCEI) to children, birth to 36 months of age, who are deaf or hard of hearing (DHH). There are only a few providers in the country providing FCEI via telepractice. But, the use of telepractice is quickly emerging as a practical alternative for providing intervention.

I am conducting this research to see if the providers of FCEI via telepractice conduct therapy in a similar way to FCEI delivered in person. You are being asked to be in this research study because you are the parent of a young child who is DHH, and you are receiving your therapy via telepractice. It is entirely your choice whether or not you choose to participate in this study. Up to 30 parents of young children, birth to 36

months of age, who are DHH will participate in the study.

What happens if I join this study?

If you join the study, you will be asked to give your permission for me to access a previously digitally-recorded video of one therapy session.

What are the possible discomforts or risks?

There are no perceived or foreseeable risks associated with this study that go beyond the normal clinical setting. Digitally-recording of therapy sessions conducted via telepractice is the current standard of care. Digitally-recorded therapy sessions that have already been conducted will be collected and analyzed. Recordings of therapy sessions will not be made solely for the purpose of this study.

The principal risk to you is that your identity may not be kept confidential. This risk is minimized because I have been trained in my responsibilities concerning the protection of participants' rights to confidentiality. I will remove names and identifying information from all protocols and analyses. There are no risks to your child. I will not analyze any child behaviors. I am only interested in the strategies and techniques used by your provider.

Any other risks are unknown and unforeseeable at this time.

What are the possible benefits of the study?

There are no direct benefits to you for participating in the study. This study is designed for me to learn more about the use of telepractice when providers offer FCEI to families. However, there may be indirect benefits to the discipline. The findings may add momentum to the emerging acceptance of telepractice. The results of this study may inform practice with young children who are DHH, with young children with other types of disabilities, and with older children who are DHH. Professional organizations may acquire the information that is needed to support a professional stance on telepractice use. And, state agencies may move forward on the establishment of policies defining the use of and reimbursement for telepractice.

Will I be paid for being in the study? Will I have to pay for anything?

You will not be paid to participate in this study. Nor will it cost you anything to be in the study.

Is my participation voluntary?

Taking part in this study is voluntary. You have the right to choose not to take part in this study. If you choose to take part, you have the right to stop at any time. If you refuse or decide to withdraw later, you will not lose any benefits or rights to which

you are entitled.

Who do I call if I have questions?

I am the primary researcher for this study. You may ask any questions you have now. If you have questions later, you may call me at (303) 818-1258. My e-mail address is: arlene.brown@colorado.edu. You may also contact my research advisor, Dr. Sandy Bowen, at 970-351-2012. Dr. Bowen's e-mail address is: sandy.bowen@unco.edu.

You may have questions about your rights as a participant in this study. You can call either me or Dr. Bowen with your questions.

Who will see my research information?

The University of Northern Colorado has rules to protect information about you. Federal and state laws including the Health Insurance Portability and Accountability Act (HIPAA) also protect your privacy. This part of the consent form tells you what information about you may be collected in this study and who might see or use it.

Your identity will be kept confidential. I will assign numeric codes to identify you and the provider on the video. The results will be coded and all participants' identifying information will be removed prior to data analysis and will not be included in any publications. A key of participant's names and the codes assigned to those names will be maintained in a separate locked cabinet. Only my research advisor and I will have access to it. I will see, use and disclose your information only as described in this form. I will do everything I can to keep your records confidential. This, however, cannot be guaranteed.

Agreement to be in this study

I have read this consent form about the study. I understand the possible risks and benefits of this study. I know that being in this study is voluntary. I choose to be in this study. I will get a copy of this consent form.

Signature: _____

Date: _____

Print name: _____

Consent form explained by: _____

Date: _____

Print name: _____

Investigator: _____

Date: _____

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APPENDIX I

RELATIONSHIPS AMONG INDEPENDENT AND DEPENDENT VARIABLES

Table 17

Associations between Highest Degree and Observation

OB	Highest Degree		Total
	Comm Dis	MA Deaf Ed	
Category 1 (20-50 occurrences)			
Count	3	0	3
Expected count	1.9	1.1	3.0
% within OB	100.0	0.0	100.0
% within highest degree	30.0	0.0	18.8
% of total	18.8	0.0	18.8
Category 2 (51-81 occurrences)			
Count	4	4	8
Expected count	5.0	3.0	8.0
% within OB	50.0	50.0	100.0
% within highest degree	40.0	66.7	50.0
% of total	25.0	25.0	50.0
Category 3 (82-112 occurrences)			
Count	3	2	5
Expected count	3.1	1.9	5.0
% within OB	60.0	40.0	100.0
% within highest degree	30.0	33.3	31.3
% of total	18.8	12.5	31.3
Total			
Count	10	6	16
Expected count	10.0	6.0	16.0
% within OB	62.5	37.5	100.0
% within highest degree	100.0	100.0	100.0
% of total	62.5	37.5	100.0

Table 18

Associations between Highest Degree and Direct Instruction

DI	Highest Degree		Total
	Comm Dis	MA Deaf Ed	
Category 1 (0-14 occurrences)			
Count	4	5	9
Expected count	5.6	3.4	9.0
% within DI	44.4	55.6	100.0
% within highest degree	40.0	83.3	56.3
% of total	25.0	31.3	56.3
Category 2 (15-29 occurrences)			
Count	3	1	4
Expected count	2.5	1.5	4.0
% within DI	75.0	25.0	100.0
% within highest degree	30.0	16.7	25.0
% of total	18.8	6.3	25.0
Category 3 (30-43 occurrences)			
Count	3	0	3
Expected count	1.9	1.1	3.0
% within DI	100.0	0.0	100.0
% within highest degree	30.0	0.0	18.8
% of total	18.8	0.0	18.8
Total			
Count	10	6	16
Expected count	10.0	6.0	16.0
% within DI	62.5	37.5	100.0
% within highest degree	100.0	100.0	100.0
% of total	62.5	37.5	100.0

Table 19

Associations between Highest Degree and Parent Practice with Feedback

PPF	Highest Degree		Total
	Comm Dis	MA Deaf Ed	
Category 1 (1-9 occurrences)			
Count	4	1	5
Expected count	3.1	1.9	5.0
% within PPF	80.0	20.0	100.0
% within highest degree	40.0	16.7	31.3
% of total	25.0	6.3	31.3
Category 2 (10-19 occurrences)			
Count	4	3	7
Expected count	4.4	2.6	7.0
% within PPF	57.1	42.9	100.0
% within highest degree	40.0	50.0	43.8
% of total	25.0	18.8	43.8
Category 3 (20-28 occurrences)			
Count	2	2	4
Expected count	2.5	1.5	4.0
% within PPF	50.0	50.0	100.0
% within highest degree	20.0	33.3	25.0
% of total	12.5	12.5	25.0
Total			
Count	10	6	16
Expected count	10.0	6.0	16.0
% within PPF	62.5	37.5	100.0
% within highest degree	100.0	100.0	100.0
% of total	62.5	37.5	100.0

Table 20

Associations between Highest Degree and Child Behavior with Provider Feedback

CBF	Highest Degree		Total
	Comm Dis	MA Deaf Ed	
Category 1 (0-16 occurrences)			
Count	5	4	9
Expected count	5.6	3.4	9.0
% within CBF	55.6	44.4	100.0
% within highest degree	50.0	66.7	56.3
% of total	31.3	25.0	56.3
Category 2 (17-33 occurrences)			
Count	4	1	5
Expected count	3.1	1.9	5.0
% within CBF	80.0	20.0	100.0
% within highest degree	40.0	16.7	31.3
% of total	25.0	6.3	31.3
Category 3 (34-50 occurrences)			
Count	1	1	2
Expected count	1.3	.8	2.0
% within CBF	50.0	50.0	100.0
% within highest degree	10.0	16.7	12.5
% of total	6.3	6.3	12.5
Total			
Count	10	6	16
Expected count	10.0	6.0	16.0
% within CBF	62.5	37.5	100.0
% within highest degree	100.0	100.0	100.0
% of total	62.5	37.5	100.0

Table 21

Associations between Certification and Observation

OB	Certification		Total
	AV	Not AV	
Category 1 (20-50 occurrences)			
Count	2	1	3
Expected count	1.7	1.3	3.0
% within OB	66.7	33.3	100.0
% within certification	22.2	14.3	18.8
% of total	12.5	6.3	18.8
Category 2 (51-81 occurrences)			
Count	3	5	8
Expected count	4.5	3.5	8.0
% within OB	37.5	62.5	100.0
% within certification	33.3	71.4	50.0
% of total	18.8	31.3	50.0
Category 3 (82-112 occurrences)			
Count	4	1	5
Expected count	2.8	2.2	5.0
% within OB	80.0	20.0	100.0
% within certification	44.4	14.3	31.3
% of total	25.0	6.3	31.3
Total			
Count	9	7	16
Expected count	9.0	7.0	16.0
% within OB	56.3	43.8	100.0
% within certification	100.0	100.0	100.0
% of total	58.3	43.8	100.0

Table 22

Associations between Certification and Direct Instruction

DI	Certification		Total
	AV	Not AV	
Category 1 (6-14 occurrences)			
Count	5	4	9
Expected count	5.1	3.9	9.0
% within DI	55.6	44.4	100.0
% within certification	55.6	57.1	56.3
% of total	31.3	25.0	56.3
Category 2 (15-29 occurrences)			
Count	2	2	4
Expected count	2.3	1.8	4.0
% within DI	50.0	50.0	100.0
% within certification	22.2	28.6	25.0
% of total	12.5	12.5	25.0
Category 3 (30-43 occurrences)			
Count	2	1	3
Expected count	1.7	1.3	3.0
% within DI	66.7	33.3	100.0
% within certification	22.2	14.3	18.8
% of total	12.5	6.3	18.8
Total			
Count	9	7	16
Expected count	9.0	7.0	16.0
% within DI	56.3	43.8	100.0
% within certification	100.0	100.0	100.0
% of total	58.3	43.8	100.0

Table 23

Associations between Certification and Parent Practice with Feedback

PPF	Certification		Total
	AV	Not AV	
Category 1 (1-9 occurrences)			
Count	3	2	5
Expected count	2.8	2.2	5.0
% within PPF	60.0	40.0	100.0
% within certification	33.3	28.6	31.3
% of total	18.8	12.5	31.3
Category 2 (10-19 occurrences)			
Count	4	3	7
Expected count	3.9	3.1	7.0
% within PPF	57.1	42.9	100.0
% within certification	44.4	42.9	43.8
% of total	25.0	18.8	43.8
Category 3 (20-28 occurrences)			
Count	2	2	4
Expected count	2.3	1.8	4.0
% within PPF	50.0	50.0	100.0
% within certification	22.2	28.6	25.0
% of total	12.5	12.5	25.0
Total			
Count	9	7	16
Expected count	9.0	7.0	16.0
% within PPF	56.3	43.8	100.0
% within certification	100.0	100.0	100.0
% of total	56.3	43.8	100.0

Table 24

Associations between Certification and Child Behavior with Provider Feedback

CBF	Certification		Total
	AV	Not AV	
Category 1 (0-16 occurrences)			
Count	6	3	9
Expected count	5.1	3.9	9.0
% within CBF	66.7	33.3	100.0
% within certification	66.7	42.9	56.3
% of total	37.5	18.8	56.3
Category 2 (17-33 occurrences)			
Count	2	3	5
Expected count	2.8	2.2	5.0
% within CBF	40.0	60.0	100.0
% within certification	22.2	42.9	31.3
% of total	12.5	18.8	31.3
Category 3 (34-50 occurrences)			
Count	1	1	2
Expected count	1.1	.9	2.0
% within CBF	50.0	50.0	100.0
% within certification	11.1	14.3	12.5
% of total	6.3	6.3	12.5
Total			
Count	9	7	16
Expected count	9.0	7.0	16.0
% within CBF	56.3	43.8	100.0
% within certification	100.0	100.0	100.0
% of total	56.3	43.8	100.0

Table 25

Association between Experience with FCEI (Based on Number of Children) and Observation

OB	FCEI Number of Children 0-9	FCEI Number of Children 10+	Total
Category 1 (20-50 occurrences)			
Count	2	1	3
Expected count	1.3	1.7	3.0
% within OB	66.7	33.3	100.0
% within FCEI # of children	28.6	11.1	18.8
% of total	12.5	6.3	18.8
Category 2 (51-81 occurrences)			
Count	3	5	8
Expected count	3.5	4.5	8.0
% within OB	37.5	62.5	100.0
% within FCEI # of children	42.9	55.6	50.0
% of total	18.8	31.3	50.0
Category 3 (82-112 occurrences)			
Count	2	3	5
Expected count	2.2	2.8	5.0
% within OB	40.0	60.0	100.0
% within FCEI # of children	28.6	33.3	31.3
% of total	12.5	18.8	31.3
Total			
Count	7	9	16
Expected count	7.0	9.0	16.0
% within OB	43.8	56.3	100.0
% within FCEI # of children	100.0	100.0	100.0
% of total	43.8	56.3	100.0

Table 26

Association between Experience with FCEI (Based on Number of Children) and Direct Instruction

DI	FCEI Number of Children 0-9	FCEI Number of Children 10+	Total
Category 1 (0-14 occurrences)			
Count	2	6	8
Expected count	3.5	4.5	8.0
% within DI	25.0	75.0	100.0
% within FCEI # of children	28.6	66.7	50.0
% of total	12.5	37.5	50.0
Category 2 (15-29 occurrences)			
Count	3	2	5
Expected count	2.2	2.8	5.0
% within DI	60.0	40.0	100.0
% within FCEI # of children	42.9	22.2	31.3
% of total	18.8	12.5	31.3
Category 3 (30-43 occurrences)			
Count	2	1	3
Expected count	1.3	1.7	3.0
% within DI	66.7	33.3	100.0
% within FCEI # of children	28.6	11.1	18.8
% of total	12.5	6.3	18.8
Total			
Count	7	9	16
Expected count	7.0	9.0	16.0
% within DI	43.8	56.3	100.0
% within FCEI # of children	100.0	100.0	100.0
% of total	43.8	56.3	100.0

Table 27

Association between Experience with FCEI (Based on Number of Children) and Parent Practice with Feedback

PPF	FCEI Number of Children 0-9	FCEI Number of Children 10+	Total
Category 1 (1-9 occurrences)			
Count	3	2	5
Expected count	2.2	2.8	5.0
% within PPF	60.0	40.0	100.0
% within FCEI # of children	42.9	22.2	31.3
% of total	18.8	12.5	31.3
Category 2 (10-19 occurrences)			
Count	3	4	7
Expected count	3.1	3.9	7.0
% within PPF	42.9	57.1	100.0
% within FCEI # of children	42.9	44.4	43.8
% of total	18.8	25.0	43.8
Category 3 (20-28 occurrences)			
Count	1	3	4
Expected count	1.8	2.3	4.0
% within PPF	25.0	75.0	100.0
% within FCEI # of children	14.3	33.3	25.0
% of total	6.3	18.8	25.0
Total			
Count	7	9	16
Expected count	7.0	9.0	16.0
% within PPF	43.8	56.3	100.0
% within FCEI # of children	100.0	100.0	100.0
% of total	43.8	56.3	100.0

Table 28

Association between Experience with FCEI (Based on Number of Children) and Child Behavior with Provider Feedback

CBF	FCEI Number of Children 0-9	FCEI Number of Children 10+	Total
Category 1 (0-16 occurrences)			
Count	3	6	9
Expected count	3.9	5.1	9.0
% within CBF	33.3	66.7	100.0
% within FCEI # of children	42.9	66.7	56.3
% of total	18.8	37.5	56.3
Category 2 (17-33 occurrences)			
Count	2	3	5
Expected count	2.2	2.8	5.0
% within CBF	40.0	60.0	100.0
% within FCEI # of children	28.6	33.3	31.3
% of total	12.5	18.8	31.3
Category 3 (34-50 occurrences)			
Count	2	0	2
Expected count	.9	1.1	2.0
% within CBF	100.0	0.0	100.0
% within FCEI # of children	28.6	0.0	12.5
% of total	12.5	0.0	12.5
Total			
Count	7	9	16
Expected count	7.0	9.0	16.0
% within CBF	43.8	56.3	100.0
% within FCEI # of children	100.0	100.0	100.0
% of total	43.8	56.3	100.0

Table 29

Association between Experience with FCEI (Based on Number of Years) and Observation

OB	FCEI Number of Children		Total
	0-9	10+	
Category 1 (20-50 occurrences)			
Count	1	2	3
Expected count	1.3	1.7	3.0
% within OB	33.3	66.7	100.0
% within FCEI # of years	14.3	22.2	18.8
% of total	6.3	12.5	18.8
Category 2 (51-81 occurrences)			
Count	4	4	8
Expected count	3.5	4.5	8.0
% within OB	50.0	50.0	100.0
% within FCEI # of years	57.1	44.4	50.0
% of total	25.0	25.0	50.0
Category 3 (82-112 occurrences)			
Count	2	3	5
Expected count	2.2	2.8	5.0
% within OB	40.0	60.0	100.0
% within FCEI # of years	28.6	33.3	31.3
% of total	12.5	18.8	31.3
Total			
Count	7	9	16
Expected count	7.0	9.0	16.0
% within OB	43.8	56.3	100.0
% within FCEI # of years	100.0	100.0	100.0
% of total	43.8	56.3	100.0

Table 30

Association between Experience with FCEI (Based on Number of Years) and Direct Instruction

DI	FCEI Number of Children		Total
	0-9	10+	
Category 1 (0-14 occurrences)			
Count	2	7	9
Expected count	3.9	5.1	9.0
% within DI	22.2	77.8	100.0
% within FCEI # of years	28.6	77.8	56.3
% of total	12.5	43.8	56.3
Category 2 (15-29 occurrences)			
Count	3	1	4
Expected count	1.8	2.3	4.0
% within DI	75.0	25.0	100.0
% within FCEI # of years	42.9	11.1	25.0
% of total	18.8	6.3	25.0
Category 3 (30-43 occurrences)			
Count	2	1	3
Expected count	1.3	1.7	3.0
% within DI	66.7	33.3	100.0
% within FCEI # of years	28.6	11.1	18.8
% of total	12.5	6.3	18.8
Total			
Count	7	9	16
Expected count	7.0	9.0	16.0
% within DI	43.8	56.3	100.0
% within FCEI # of years	100.0	100.0	100.0
% of total	43.8	56.3	100.0

Table 31

Association between Experience with FCEI (Based on Number of Years) and Parent Practice with Feedback

PPF	FCEI Number of Children 0-9	FCEI Number of Children 10+	Total
Category 1 (1-9 occurrences)			
Count	1	4	5
Expected count	2.2	2.8	5.0
% within PPF	20.0	80.0	100.0
% within FCEI # of years	14.3	44.4	31.3
% of total	6.3	25.0	31.3
Category 2 (10-19 occurrences)			
Count	5	2	7
Expected count	3.1	3.9	7.0
% within PPF	71.4	28.6	100.0
% within FCEI # of years	71.4	22.2	43.8
% of total	31.3	12.5	43.8
Category 3 (20-28 occurrences)			
Count	1	3	4
Expected count	1.8	2.3	4.0
% within PPF	25.0	75.0	100.0
% within FCEI # of years	14.3	33.3	25.0
% of total	6.3	18.8	25.0
Total			
Count	7	9	16
Expected count	7.0	9.0	16.0
% within PPF	43.8	56.3	100.0
% within FCEI # of years	100.0	100.0	100.0
% of total	43.8	56.3	100.0

Table 32

Association between Experience with FCEI (Based on Number of Years) and Child Behavior with Provider Feedback

CBF	FCEI Number of Children 0-9	FCEI Number of Children 10+	Total
Category 1 (0-16 occurrences)			
Count	1	8	9
Expected count	3.9	5.1	9.0
% within CBF	11.1	88.9	100.0
% within FCEI # of years	14.3	88.9	56.3
% of total	6.3	50.0	56.3
Category 2 (17-33 occurrences)			
Count	4	1	5
Expected count	2.2	2.8	5.0
% within CBF	80.0	20.0	100.0
% within FCEI # of years	57.1	11.1	31.3
% of total	25.0	6.3	31.3
Category 3 (34-50 occurrences)			
Count	2	0	2
Expected count	.9	1.1	2.0
% within CBF	100.0	0.0	100.0
% within FCEI # of years	28.6	0.0	12.5
% of total	12.5	0.0	12.5
Total			
Count	7	9	16
Expected count	7.0	9.0	16.0
% within CBF	43.8	56.3	100.0
% within FCEI # of years	100.0	100.0	100.0
% of total	43.8	56.3	100.0

Table 33

Association between Telepractice with Children of All Ages and Observation

OB	Telepractice All Ages		Total
	<5 – 40	>40	
Category 1 (20-50 occurrences)			
Count	0	3	3
Expected count	.8	2.3	3.0
% within OB	0.0	100.0	100.0
% within telepractice all ages	0.0	25.0	18.8
% of total	0.0	18.8	18.8
Category 2 (51-81 occurrences)			
Count	2	6	8
Expected count	2.0	6.0	8.0
% within OB	25.0	75.0	100.0
% within telepractice all ages	50.0	50.0	50.0
% of total	12.5	37.5	50.0
Category 3 (82-112 occurrences)			
Count	2	3	5
Expected count	1.3	3.8	5.0
% within OB	40.0	60.0	100.0
% within telepractice all ages	50.0	25.0	31.3
% of total	12.5	18.8	31.3
Total			
Count	4	12	16
Expected count	4.0	12.0	16.0
% within OB	25.0	75.0	100.0
% within telepractice all ages	100.0	100.0	100.0
% of total	25.0	75.0	100.0

Table 34

Association between Telepractice with Children of All Ages and Direct Instruction

DI	Telepractice All Ages <5 – 40	Telepractice All Ages >40	Total
Category 1 (0-14 occurrences)			
Count	1	8	9
Expected count	2.3	6.8	9.0
% within DI	11.1	88.9	100.0
% within telepractice all ages	25.0	66.7	56.3
% of total	6.3	50.0	56.3
Category 2 (15-29 occurrences)			
Count	2	2	4
Expected count	1.0	3.0	4.0
% within DI	50.0	50.0	100.0
% within telepractice all ages	50.0	16.7	25.0
% of total	12.5	12.5	25.0
Category 3 (30-43 occurrences)			
Count	1	2	3
Expected count	.8	2.3	3.0
% within DI	33.3	66.7	100.0
% within telepractice all ages	25.0	16.7	18.8
% of total	6.3	12.5	18.8
Total			
Count	4	12	16
Expected count	4.0	12.0	16.0
% within DI	25.0	75.0	100.0
% within telepractice all ages	100.0	100.0	100.0
% of total	25.0	75.0	100.0

Table 35

Association between Telepractice with Children of All Ages and Parent Practice with Provider Feedback

PPF	Telepractice All Ages <5 – 40	Telepractice All Ages >40	Total
Category 1 (1-9 occurrences)			
Count	0	5	5
Expected count	1.3	3.8	5.0
% within PPF	0.0	100.0	100.0
% within telepractice all ages	0.0	41.7	31.3
% of total	0.0	31.3	31.3
Category 2 (10-19 occurrences)			
Count	3	4	7
Expected count	1.8	5.3	7.0
% within PPF	42.9	57.1	100.0
% within telepractice all ages	75.0	33.3	43.8
% of total	18.8	25.0	43.8
Category 3 (20-28 occurrences)			
Count	1	3	4
Expected count	1.0	3.0	4.0
% within PPF	25.0	75.0	100.0
% within telepractice all ages	25.0	25.0	25.0
% of total	6.3	18.8	25.0
Total			
Count	4	12	16
Expected count	4.0	12.0	16.0
% within PPF	25.0	75.0	100.0
% within telepractice all ages	100.0	100.0	100.0
% of total	25.0	75.0	100.0

Table 36

Association between Telepractice with Children of All Ages and Child Behavior with Provider Feedback

CBF	Telepractice All Ages <5 – 40	Telepractice All Ages >40	Total
Category 1 (0-16 occurrences)			
Count	1	8	9
Expected count	2.3	6.8	9.0
% within CBF	11.1	88.9	100.0
% within telepractice all ages	25.0	66.7	56.3
% of total	6.3	50.0	56.3
Category 2 (17-33 occurrences)			
Count	2	3	5
Expected count	1.3	3.8	5.0
% within CBF	40.0	60.0	100.0
% within telepractice all ages	50.0	25.0	31.3
% of total	12.5	18.8	31.3
Category 3 (34-50 occurrences)			
Count	1	1	2
Expected count	.5	1.5	2.0
% within CBF	50.0	50.0	100.0
% within telepractice all ages	25.0	8.3	12.5
% of total	6.3	6.3	12.5
Total			
Count	4	12	16
Expected count	4.0	12.0	16.0
% within CBF	25.0	75.0	100.0
% within telepractice all ages	100.0	100.0	100.0
% of total	25.0	75.0	100.0

Table 37

Association between Telepractice with Children Birth to 36 Months and Observation

OB	Telepractice Birth to 36 Months		Total
	<5 – 40	>40	
Category 1 (20-50 occurrences)			
Count	2	1	3
Expected count	1.3	1.7	3.0
% within OB	66.7	33.3	100.0
% within telepractice birth-36	28.6	11.1	18.8
% of total	12.5	6.3	18.8
Category 2 (51-81 occurrences)			
Count	3	5	8
Expected count	3.5	4.5	8.0
% within OB	37.5	62.5	100.0
% within telepractice birth-36	42.9	55.6	50.0
% of total	18.8	31.3	50.0
Category 3 (82-112 occurrences)			
Count	2	3	5
Expected count	2.2	2.8	5.0
% within OB	40.0	60.0	100.0
% within telepractice birth-36	28.6	33.3	31.3
% of total	12.5	18.8	31.3
Total			
Count	7	9	16
Expected count	7.0	9.0	16.0
% within OB	43.8	56.3	100.0
% within telepractice birth-36	100.0	100.0	100.0
% of total	43.8	56.3	100.0

Table 38

Association between Telepractice with Children Birth to 36 Months and Direct Instruction

DI	Telepractice Birth to 36 Months <5 – 40	Telepractice Birth to 36 Months >40	Total
Category 1 (0-14 occurrences)			
Count	3	6	9
Expected count	3.9	5.1	9.0
% within DI	33.3	66.7	100.0
% within telepractice birth-36	42.9	66.7	56.3
% of total	18.8	37.5	56.3
Category 2 (15-29 occurrences)			
Count	2	2	4
Expected count	1.8	2.3	4.0
% within DI	50.0	50.0	100.0
% within telepractice birth-36	28.6	22.2	25.0
% of total	12.5	12.5	25.0
Category 3 (30-43 occurrences)			
Count	2	1	3
Expected count	1.3	1.7	3.0
% within DI	66.7	33.3	100.0
% within telepractice birth-36	28.6	11.1	18.8
% of total	12.5	6.3	18.8
Total			
Count	7	9	16
Expected count	7.0	9.0	16.0
% within DI	43.8	56.3	100.0
% within telepractice birth-36	100.0	100.0	100.0
% of total	43.8	56.3	100.0

Table 39

Association between Telepractice with Children Birth to 36 Months and Parent Practice with Feedback

PPF	Telepractice Birth to 36 Months <5 – 40	Telepractice Birth to 36 Months >40	Total
Category 1 (1-9 occurrences)			
Count	2	3	5
Expected count	2.2	2.8	5.0
% within PPF	40.0	60.0	100.0
% within telepractice birth-36	28.6	33.3	31.3
% of total	12.5	18.8	31.3
Category 2 (10-19 occurrences)			
Count	4	3	7
Expected count	3.1	3.9	7.0
% within PPF	57.1	42.9	100.0
% within telepractice birth-36	57.1	33.3	43.8
% of total	25.0	18.8	43.8
Category 3 (20-28 occurrences)			
Count	1	3	4
Expected count	1.8	2.3	4.0
% within PPF	25.0	75.0	100.0
% within telepractice birth-36	14.3	33.3	25.0
% of total	6.3	18.8	25.0
Total			
Count	7	9	16
Expected count	7.0	9.0	16.0
% within PPF	43.8	56.3	100.0
% within telepractice birth-36	100.0	100.0	100.0
% of total	43.8	56.3	100.0

Table 40

Association between Telepractice with Children Birth to 36 Months and Child Behavior with Provider Feedback

CBF	Telepractice Birth to 36 Months <5 – 40	Telepractice Birth to 36 Months >40	Total
Category 1 (0-16 occurrences)			
Count	2	7	9
Expected count	3.9	5.1	9.0
% within CBF	22.2	77.8	100.0
% within telepractice birth-36	28.6	77.8	56.3
% of total	12.5	43.8	56.3
Category 2 (17-33 occurrences)			
Count	4	1	5
Expected count	2.2	2.8	5.0
% within CBF	80.0	20.0	100.0
% within telepractice birth-36	57.1	11.1	31.3
% of total	25.0	6.3	31.3
Category 3 (34-50 occurrences)			
Count	1	1	2
Expected count	.9	1.1	2.0
% within CBF	50.0	50.0	100.0
% within telepractice birth-36	14.3	11.1	12.5
% of total	6.3	6.3	12.5
Total			
Count	7	9	16
Expected count	7.0	9.0	16.0
% within CBF	43.8	56.3	100.0
% within telepractice birth-36	100.0	100.0	100.0
% of total	43.8	56.3	100.0