Comparison of Telepractice and In-Person Models of Family-Centred Early Intervention for Children who are Deaf or Hard of Hearing

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DECLARATIONS

Statement of originality

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Chapter 3: McCarthy, M., Leigh, G., & Arthur-Kelly, M. (2020b). Practitioners' selfassessment of family-centred practice in telepractice versus in-person early intervention. *The Journal of Deaf Studies and Deaf Education*. Advance online publication. doi:10.1093/deafed/enaa028

Chapter 4: McCarthy, M., Leigh, G., & Arthur-Kelly, M. (2020a). Comparison of caregiver engagement in telepractice and in-person family-centered early intervention. *The Journal of Deaf Studies and Deaf Education*, *25*(1), 33-42. doi:10 .1093/deafed/enz037

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PRESENTATIONS ARISING FROM THIS THESIS

During my candidature, I presented results arising from the studies incorporated in this thesis at six international conferences and six national conferences. This resulted in thirteen refereed presentations: eleven oral presentations and two poster presentations. In 2019, I was awarded a University of Newcastle (School of Education) Conference Travel Scholarship to attend the American Cochlear Implant Alliance 16th Symposium on Cochlear Implants in Children in Florida, USA.

2016

McCarthy, M., Leigh, G., Arthur-Kelly, M. (2016, June 3rd). Perceptions of family empowerment in tele-intervention. Presentation at *Hearing Across the Lifespan (HEAL2016)*, Cernobbio, Italy.

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McCarthy, M., Leigh, G., Arthur-Kelly, M. (2017, May 20th). Widening horizons: A study on the use of telepractice to deliver family-centred early intervention. Presentation at 9th *Australasian Newborn Hearing Screening Conference*, Melbourne, Australia.

2018

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2019

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LIST OF TERMS AND ABBREVIATIONS

The following is a list of definitions for the terms and abbreviations used throughout this thesis.

Caregiver: A parent, grandparent, relative, legal guardian, or another individual who is primarily responsible for the care of an infant or young child.

Deaf or hard of hearing (DHH): An overarching term used to describe individuals with varying levels of hearing loss from mild to profound, encompassing a range of different types, configurations, and aetiologies. In the context of this thesis the term is inclusive of individuals who identify themselves as culturally Deaf, regardless of hearing level.

Early childhood: The period of child development between birth and eight years of age.

Early childhood intervention: The provision of resources, supports, and services to families whose children have, or are at risk of developing, a disability or developmental delay during early childhood (the period from birth to eight years of age).

Family-centred early intervention (FCEI): An intervention approach that recognises families' inherent strengths and competencies, which is characterised by a collaborative partnership between families and practitioners that aims to enhance caregivers' confidence, competence, and involvement in supporting their child with a disability or developmental delay.

ICT: Information and Communication Technology—technologies and resources that transmit digital information to enable individuals to communicate and exchange information at a distance.

In-person: Physical presence of individuals in a particular location.

MPOC-SP: Measures of Processes of Care for Service Providers—a self-assessment instrument designed to examine practitioners' use of family-centred practices.

Participant: An individual who participates in an early intervention session, including practitioners, caregivers, and children.

Practitioner: A qualified professional, specifically a speech pathologist or teacher of the deaf, who provides early childhood intervention services to children and their families.

Telepractice: The use of synchronous audio and video technology to connect practitioners and families in real-time for the direct provision of services, regardless of their individual locations.

TIERS: Triadic Intervention Evaluation Rating Scale—an instrument designed to evaluate the behaviours and roles of participants in an early intervention session and the interactions and relationships that develop among participants.

Triad: A collective group of individuals consisting of a practitioner, a caregiver, and a child.

Triadic interaction: The collaborative relationships that develop among practitioner, caregiver, and child in the context of family-centred early intervention that are characterised by practitioners' use family-centred practices that support caregivers' confidence and competence to participate actively in facilitating their children's early development.

SPISE: Scale of Parental Involvement and Self-Efficacy—a self-assessment instrument designed to measure the levels of self-efficacy and involvement reported by parents of children who are DHH.

ABSTRACT

Young children who are deaf or hard of hearing (DHH) require specialised early intervention support to achieve communication, language and developmental outcomes comparable to their same-age hearing peers. The use of family-centred early intervention (FCEI) is an internationally accepted standard for providing this support. FCEI involves families as equal partners in all aspects of early intervention including planning, implementation, and evaluation. Practitioners using FCEI aim to work collaboratively with families, build on family strengths, and expand existing family capacity. For many families with children who are DHH, access to timely and consistent FCEI is limited by a lack of appropriate services, geographical barriers, and workforce shortages. Practitioners have attempted to address these disparities by introducing a model of telepractice—the use of synchronous audio and video technology to connect practitioners and families in real-time, regardless of their individual locations. However, there is limited research examining the efficacy of telepractice in achieving the principles of FCEI. There are two aspects to this challenge. The first relates to practitioners' ability to use family-centred practices in a telepractice setting, and the second relates to caregivers' level of engagement and participation when FCEI is delivered through telepractice.

The series of studies reported in this thesis compared the self-reported and observed behaviours of practitioners and caregivers who were engaged in FCEI inperson with those of similar practitioners and caregivers who were engaged in FCEI through telepractice. The participants were all involved in programs provided by one organisation that operated two separate FCEI programs for children who are DHH: one in-person and the other through telepractice. Participants included 141 caregivers (100 in-person and 41 telepractice) and 38 practitioners (23 in-person and 15 telepractice). In the first of two stages, practitioners completed a self-assessment of their use of familycentred practices (the Measures of Processes of Care for Service Providers), and caregivers completed a self-assessment of their own self-efficacy and involvement in their child's early intervention (the Scale of Parental Involvement and Self-Efficacy). A subset of this group participated in the second stage of the study, which used an observational instrument (the Triadic Intervention and Evaluation Scale) to evaluate practitioners' use of family-centred behaviours and caregivers' level of participation and also to categorise the roles enacted by practitioners and caregivers and the relationships formed during the intervention session.

Results of the self-assessments showed that there were no differences between the in-person and telepractice groups for both practitioners' use of family-centred practices and caregivers' levels of self-efficacy and involvement. Results from the observational analysis showed significant differences between in-person and telepractice groups for both practitioners' use of specific FCEI behaviours and caregivers' level of participation. In addition, there were significant differences between the two groups regarding practitioner and caregiver roles and the relationships formed between practitioners, caregivers, and children.

These findings support the conclusions that (a) FCEI can be delivered through telepractice in a manner that is comparable to in-person delivery; and (b) in some circumstances, telepractice may enable practitioners to adhere more consistently to the principles of FCEI than practitioners in-person, which, in turn, provides children and families the opportunity to more fully realise the intended outcomes of FCEI. Overall, the evidence presented supports the viability of telepractice for delivering FCEI, and suggests that telepractice can provide an acceptable alternative to in-person delivery of FCEI.

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CHAPTER 1: OVERVIEW

1.1 Background

Infants and young children who are deaf or hard of hearing (DHH) require specialised early intervention support to achieve communication, language, and developmental outcomes comparable to their same-age hearing peers (Ching, 2015; Joint Committee on Infant Hearing (JCIH), 2013, 2019; Yoshinaga-Itano, Johnson, Carpenter, & Stredler-Brown, 2008). The internationally accepted standard for providing early intervention is the use of a family-centred approach (S. Brown & Guralnick, 2012; Moeller, Carr, Seaver, Stredler-Brown, & Holzinger, 2013; JCIH, 2013, 2019). A family-centred approach views the family as equal partners in all aspects of early intervention including planning, implementation, and evaluation. Familycentred practices create collaborative partnerships between the practitioner and family, recognise the unique values of each family, nurture existing family strengths, and increase family confidence and competence in supporting their child. A family-centred approach also uses the context of familiar routines and activities to support the child's meaningful participation within their family and community.

The positive outcomes of a family-centred approach for children and families have been well-documented over the last three decades (Allen & Petr, 1996; Dunst & Espe-Sherwindt, 2016; Epley, Summers, & Turnbull, 2010; Guralnick, 2020). However, a number of known issues, including a lack of appropriate services, workforce shortages, geographical barriers, and financial constraints, can limit families' access to family-centred early intervention (FCEI) (Arefadib & Moore, 2017; Barr, Duncan, & Dally, 2018; McCarthy, Leigh, & Arthur-Kelly, 2019). In addition, certain demographic, social, family, and clinical characteristics can negatively affect families' engagement with early intervention services (McLean, Ware, Heussler, Harris, & Beswick, 2019). In an effort to increase families' participation in FCEI, a new model of service delivery—telepractice—has emerged. Telepractice enables the provision of services by using videoconferencing technology to transmit synchronous, real-time audio and video signals between the practitioner and the family, irrespective of their individual locations. Telepractice has been used widely in the fields of medicine, allied health, and higher education (Smith et al., 2020; Wijessoriya, Mishra, Brand & Rubin, 2020), but its use in FCEI, particularly for children who are DHH, is a relatively new phenomenon.

1.2 Early Childhood Intervention

In broad terms, early childhood intervention is the provision of services and supports to young children with disability or developmental delay, and their families. The aim of early childhood intervention is to support the development of functional skills that will enable the child's meaningful participation in their family and community (Individuals with Disabilities Education Act, 2004; National Disability Insurance Scheme (NDIS), 2020). This outcome is most effectively achieved by enhancing families' competence and confidence in providing their child with learning opportunities with familiar people within the context of familiar environments and daily routines (Dunst & Espe-Sherwindt, 2016; McWilliam, 2016; Moore, 2012; Guralnick, 2020).

1.2.1 Legislation

The importance of early childhood intervention has been recognised for more than three decades (Allen & Petr, 1996; Dunst & Espe-Sherwindt, 2016; Epley, Summers, & Turnbull, 2010; Guralnick, 2020). In the United States, early intervention was mandated for children with disabilities for the first time in 1986 when the Education of the Handicapped Act was amended to include the provision of services for

infants and toddlers (Education of the Handicapped Act Amendments of 1986, section 1431). This same law noted the importance of enhancing families' capacity to support the needs of their children with disabilities. In Australia, early intervention for children with developmental delays and disabilities is provided under the auspices of the National Disability Insurance Scheme (NDIS) using an approach that aims to build family capacity and support inclusion in everyday settings (NDIS, 2020; Sukkar, 2013). The NDIS specifically targets early childhood interventions that enable caregivers to implement supports and enhance a child's ability to participate in activities of daily living (Joint Standing Committee on the NDIS, 2017). These interventions supplement existing educational and health services in Australia rather than replacing them (Joint Standing Committee on the NDIS, 2017). Like many other countries, Australia has ratified the United Nations (UN) Convention on the Rights of the Child (1990) and Convention on the Rights of Persons with Disabilities (2008), both of which endorse the provision of supports and services that promote early childhood intervention (S. Brown & Guralnick, 2012; Office of the United Nations High Commissioner for Human Rights, 1990, 2008).

1.2.2 Evolution of practice

Approaches to the provision of early intervention supports have developed and changed over time in response to research, advances in practice, and developments in related fields (Dunst, 2012; Guralnick & Bruder, 2019; Moore, 2012). Early childhood intervention was originally defined by the Individuals with Disabilities Act (1990) as the provision of services that would directly alter the child's behaviour (Dunst, 2012; Moore, 2012). More recently, early childhood intervention approaches have changed to focus on supporting caregivers in the provision of learning opportunities that promote the child's ability to participate in everyday environments (Guralnick & Bruder, 2019;

Moore, 2012). This shift from services to experiences has necessarily altered the role of the practitioner from agent of change directly interacting with the child, to one of facilitator enabling the primary caregiver and family members to become the agents of change (Moore, 2012; Dunst, 2012). Family-centred early intervention (FCEI) is the term used to describe this particular way of working with children and families.

1.2.3 Family-centred early intervention (FCEI)

Practitioners using an FCEI approach employ specific help-giving practices to build relationships with families and promote family engagement in the intervention process (Dunst, & Espe-Sherwindt, 2016). Help-giving practices are described as either relational or participatory. Relational practices focus on developing collaborative and reciprocal relationships with families based on mutual respect, trust, honesty, compassion, and effective communication (Dunst & Espe-Sherwindt, 2016; Moeller et al., 2013). Participatory practices foster existing family strengths, build family capacity, and support families to make fully informed decisions about their child's future (Dunst & Espe-Sherwindt, 2016; Moeller et al., 2013). Together, these two types of practices shape the way practitioners interact with families to build and strengthen their competence and confidence in supporting their child's early development (Dunst, Hamby, & Raab, 2019). The use of family-centred practices reflects a particular way of interacting with families and represents the manner in which practitioners provide support to families, regardless of the child's individual needs. In contrast, the specific interventions that practitioners deliver (e.g., Hanen It Takes Two to Talk, Positive Parenting Program, or Auditory-Verbal Therapy) represent the content of the early intervention session and are dependent on the needs of the individual child and their family (Dunst et al., 2019).

1.2.4 Heterogeneity of needs

Early childhood intervention is available to children who experience a wide range of disabilities, delays, and risk factors. This broad scope means that practitioners will encounter diverse caseloads of children with widely differing needs (Committee on Integrating the Science of Early Childhood Development, 2000). For many children, the general principles of early development will be sufficient to guide services and supports that address the needs of the child and family. However, for children who are DHH, specific interventions (known as *special instruction* in the United States), such as the explicit development of listening skills or the introduction of sign language, are required to fully support their developmental outcomes, particularly in communication and language development (Division for Early Childhood, 2014).

1.3 FCEI for children who are DHH

Children who are DHH may experience developmental delays across many aspects of early development, but the most common areas of risk include language, communication, cognitive, and social-emotional skills. As a result, FCEI for children who are DHH focuses primarily on increasing access to linguistic input and minimising any delays in their communication and language development, which could, in turn, affect their cognitive and social-emotional skills (JCIH, 2019). In order to achieve communication and language outcomes that are similar to their same-age peers with typical levels of hearing, children who are DHH require specialised early intervention support (JCIH, 2007, 2013, 2019; Moeller et al., 2013; Sass-Lehrer, 2011; Yoshinaga-Itano, 2011). Practitioners who provide services to children who are DHH and their families will typically seek to enhance the language environment, improve caregiverchild communication, and enable meaningful participation in the family and community.

1.3.1 Practitioner skills

Practitioners who provide early childhood intervention vary in their professional backgrounds, pre-professional training, and certification standards (Gallego et al., 2018; Harrison et al., 2016). Those who support children who are DHH require the same skills as any early intervention practitioner, complemented by additional specialist skills that address the unique needs of this group (Marschark & Knoors, 2012; JCIH 2013, 2019; Moeller et al., 2013). Knowledge and skills in areas such as educational audiology, speech and hearing science, diagnosis and aetiology of hearing loss, communication options, the impact of deafness on language and literacy development, and assessment of students with hearing loss are usually additional to that of most early intervention providers or generalist special educators (Easterbrooks, 2008a, 2008b; Luckner, Muir, Howell, Sebald, & Young, 2005; Luckner, Slike, & Johnson, 2012; Marschark & Knoors, 2012). Practitioners who work with children who are DHH typically obtain this knowledge through specific training programs in deaf education, speech pathology, or audiology. Their expertise in these areas is linked to the quality of services provided and positively associated with child outcomes (JCIH, 2013, 2019).

1.3.2 Barriers to access

Although evidence supporting the use of FCEI is clear, external factors may limit access to appropriate services. Geographic barriers such as large distances between families and services or hazardous travel conditions are often apparent. However, less obvious are the often-associated financial and safety implications of these factors, such as the costly, time-consuming, and often arduous journeys required to attend early intervention sessions (Arefadib & Moore, 2017; Dew et al., 2014; Hussain & Tait, 2015). Families who are not negatively affected by these geographic conditions may still be hindered by limited transportation, scheduling difficulties or additional family responsibilities (Chen & Liu, 2017; Dew et al., 2014; McLean et al., 2019; McCarthy et al., 2019). Equally challenging are the barriers related to workforce shortages, uneven distribution of qualified practitioners, and the low incidence of permanent childhood hearing loss, all of which contribute to a mismatch between practitioners' capacity to deliver services and families' ability to access services (Arefadib & Moore, 2017; Hussain & Tait, 2015; McCarthy et al., 2019). Consequently, families and children who require early childhood intervention—particularly those who live in rural and remote areas—often do not have timely and ongoing access to the quantity and quality of supports that they require. (Australian Early Development Census (AEDC), 2019; J. Campbell, Theodoros, Russell, Gillespie, & Hartley, 2019; Hines, Lincoln, Ramsden, Martinovich, & Fairweather, 2015; JCIH, 2013, 2019).

1.3.2.1 Geography

Families who live in rural and remote areas experience reduced access to early intervention services in comparison with families who live in metropolitan areas (Aredafib & Moore, 2017; Dew et al., 2012). In many cases, services are entirely unavailable in the local community, or, when they are available—often in the form of outreach services—the frequency is inadequate, resulting in long waiting periods for access (Aredafib & Moore, 2017; Gallego et al., 2018). To overcome the lack of local services, many families are required to travel long distances to access services in a larger regional or metropolitan community (Dew et al., 2014).

1.3.2.2 Demography

Children who are DHH comprise a low-incidence disability group, which means that the population of children who are DHH will be relatively small in any given community (JCIH, 2007). In addition, children who are DHH have diverse support needs related to a range of variable characteristics including their mode of

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communication (i.e., spoken, signed or some combination thereof), use of hearing technology, and cause of deafness, among others (JCIH, 2013). Approximately 30% of children who are DHH will present with other disabilities in addition to their hearing loss (Cupples et al., 2014; JCIH, 2007). Consequently, it is difficult for communities to establish permanent services that will be able to meet the individual needs of every child who is DHH (Arefadib & Moore, 2017; McCarthy et al., 2019). Furthermore, the low-incidence nature of deafness results in an unpredictable demand for specialised services over time (JCIH, 2019). These demographic factors combine to mean that services appropriate to the needs of children who are DHH and their families are very often limited or not available in many locations where the need presents.

1.3.2.3 Workforce issues

The provision of FCEI for children who are DHH and their families is a highly specialised task and there are relatively few practitioners who possess the required knowledge, skills, and expertise to provide such services (JCIH, 2013, 2019; Senate Community Affairs References Committee, 2010). Given the relatively short supply of appropriately qualified professionals it can be particularly difficult to recruit for staff positions in rural and remote areas, which may appear less attractive than positions in larger urban centres (Arefadib & Moore, 2017; Gallego et al., 2015; Lincoln et al., 2014; Rude & Miller, 2018). Even when appropriately qualified professionals are recruited to rural and remote areas, practitioners typically face numerous challenges including diverse caseloads, large territories, limited resources, and fewer opportunities for professional development and collegial support. All of these factors contribute to high levels of staff turnover and to positions often remaining vacant for extended periods (Arefadib & Moore, 2017; Gallego et al., 2015; Lincoln et al., 2014; Rude & Miller, 2017; Gallego et al., 2015; Lincoln et al., 2014; Rude & Moore, 2017; Gallego et al., 2015; Lincoln et al., 2014; Rude & Migh levels of staff turnover and to positions often remaining vacant for extended periods (Arefadib & Moore, 2017; Gallego et al., 2015; Lincoln et al., 2014; Rude & Miller, 2018). In many communities, the only available solution is to engage generalist

early intervention practitioners who may be unfamiliar with current best practices in supporting children who are DHH.

1.3.2.4 Economic constraints

The establishment of a specialised local service for a relatively small number of children may represent a disproportionate degree of expense for a rural community, particularly given the high cost of recruiting specialist staff who are unlikely to be fully utilised (Dew et al., 2016; J. Campbell et al., 2019). For families, a lack of local services often requires travel to a major city, which represents a significant burden on their time and finances, and may also require time away from work and overnight stays away from home (Dew et al., 2013; Dew et al., 2014; Gallego et al., 2017; Johnson, Lincoln, & Cumming, 2020). Similarly, outreach services (i.e., where practitioners travel from larger population centres to rural communities) incur costs for service providers associated with travel and unproductive staff time (Aredafib & Moore, 2017; Dew et al., 2016). This is particularly evident in areas when practitioners are faced with vast distances, rough terrain, and unpredictable weather patterns.

1.4 Telepractice

1.4.1 Background

The use of information and communications technology (ICT) to provide services to clients at a distance has its origins in the field of medicine (Bashshur & Armstrong, 1976, Wijesooriya et al., 2020). Since its inception, many different terms have been used to describe this process including telehealth, telemedicine, telecare, ehealth, and, more recently, m-health. In healthcare, subspecialties are also identified such as tele-psychiatry and tele-dermatology. As the use of ICT has expanded to other sectors, these terms have been adapted and expanded to distinguish between such medical services and other services provided by professionals in areas such as

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education, early intervention, and allied health. Although a preponderance of terms continues to be used to describe the latter category (e.g., telerehabilitation, teletherapy, and tele-intervention), consensus is emerging around the term *telepractice*. The peak bodies for speech-language pathologists and audiologists in the United States, Canada, and Australia have adopted the term telepractice to refer to the use of ICT to provide speech, language and hearing services at a distance by connecting clinician and client (and caregiver) for the purposes of assessment, intervention, and/or consultation (American Speech-Language-Hearing Association, n.d.; Speech Pathology Australia, 2014; Speech-Language & Audiology Canada, 2006). For the purposes of the present investigation, which concerned children who are DHH, the term telepractice was used for clarity and consistency.

1.4.2 Evolution of Telepractice

Although models of tele-delivery of services have been widely used in the medical and allied health fields for more than two decades (Perednia & Allen, 1995; Wijessoriya et al., 2020), their use has generally focused on consultative models rather than direct service provision. More recently, advances in telecommunications technology and the wider availability of high-speed broadband connections have provided increased opportunities for the use of telepractice to deliver direct service provision (Baggett et al., 2010; Cason, Behl, & Ringwalt, 2012). Notably, during 2020, a major impact of the COVID-19 pandemic has been an even more rapid increase in the use of telepractice across a broad range of fields (Bashshur, Doarn, Frenk, Kvedar, & Woolliscroft, 2020; Latifi & Doarn, 2020; Wijesooriya et al., 2020).

1.4.3 Evidence regarding telepractice

An extensive research base exists in the health sector to support the use of telepractice as an alternative to traditional face-to-face service provision (Abrams &

Geier, 2006; Anvari, 2007; Davis et al., 2014; Polinski et al., 2016; Sabesan et al., 2012; Tousignant et al., 2011). This evidence has supported the expansion of telepractice into allied health fields including audiology and speech pathology (Eikelboom, Jayakody, Swanepoel, Chang & Atlas, 2014; Govender & Mars, 2016; Molini-Avejonas et al., 2015; Swanepoel & Hall 2010; Taylor et al., 2015; Visagie, Swanepoel, & Eikelboom, 2015). The research in these contexts relates primarily to adults and older children with limited research examining the application of telepractice with young children (J. Campbell et al., 2019; Hines, Bulkeley, Dudley, Cameron, & Lincoln, 2019). More broadly, in the field of early childhood intervention, numerous studies have documented the practicality of using telepractice to provide services for children with a range of disabilities and delays, with most research focusing on children with autism or other developmental disabilities (Akemoglu, Muharib, & Meadan, 2020; Ashburner, Vickerstaff, Beetge, & Copley, 2016; Little, Pope, Wallisch, & Dunn, 2018; McDuffie et al., 2016; Meadan et al., 2016; Kelso, Fiechtl, Olsen, & Rule, 2009; Vismara et al., 2016).

For children who are DHH, however, the majority of evidence is anecdotal (Stredler-Brown, 2012a), or pertains to participant satisfaction with the telepractice mode of service delivery (Blaiser & Edwards, 2012; Broekelman, 2012; Constantinescu, 2012; Lalios, 2012; McCarthy, 2012). These reports have indicated that participants were satisfied with the access to services that telepractice provided, but did not investigate the quality of the services provided. Only a small number of studies have compared interventions delivered in-person directly with those delivered through telepractice (Behl et al., 2017; Blaiser, Behl, Callow-Heusser, & White, 2013; A. S. Brown, 2015; P.M. Brown & Remine, 2008; Havenga, Swanepoel, le Roux, & Schmid, 2017). Each of these comparative studies reported findings demonstrating that

telepractice service delivery resulted in outcomes that were no different, or significantly better, than in-person outcomes. However, study limitations such as small sample sizes, limited duration of intervention, and non-random participant assignment led researchers to suggest that further high-quality evidence was required to corroborate these findings (Behl et al., 2017; Blaiser et al., 2013; A. S. Brown, 2015; Constantinescu, 2014; Havenga et al., 2017). Overall, the evidence to support the use of telepractice with young children who are DHH is limited but encouraging of the view that it is a viable alternative to the use of in-person services. Further research is warranted to build on these findings and establish the efficacy of telepractice for the delivery of familycentred early intervention for children who are DHH.

1.5 Research design

The research reported in this thesis comprised a series of investigations including a scoping review of the relevant literature and a multi-stage comparative study of practitioner and caregiver behaviours in telepractice and in-person settings (see Figure 1). First, the existing literature was systematically reviewed to examine the issues related to the use of telepractice to provide FCEI to children who are DHH, and their families. Next, samples of caregivers and practitioners from telepractice and inperson early intervention programs participated in self-assessments of their respective behaviours related to FCEI. Practitioners evaluated their use of family-centred practices, and caregivers evaluated their self-efficacy and involvement in supporting their child's early development. Results from each group (i.e., practitioners and caregivers) were compared between the telepractice and in-person programs. Finally, formal observations of a sub-sample of those caregivers and practitioners were recorded within the context of typical FCEI sessions in telepractice and in-person. Data were analysed in terms of the practitioner and caregiver behaviours, participants' roles, and the relationships

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between participants. Results were compared between the telepractice and in-person

groups.

Scoping Review Telepractice delivery of familycentred early intervention

Family-Centred Early Intervention

\bullet	Telepractice	In-Person	
Study 1 Family-centred practices	Practitioners	Practitioners	ESSMENT
Study 2 Self-efficacy and involvement	Caregivers	Caregivers	SELF-ASS
₽			
Study 3 Capacity-building practices	Practitioners	Practitioners	VATION
Participation and responsiveness	Caregivers	Caregivers	OBSER
Triadic Interactions	Caregivers Children	Caregivers Children Practitioners	BEHAVIOURAL

Figure 1.1. Conceptual model of overarching research design

1.6 Thesis structure

The results of these various component studies are presented here as a thesis by publication consisting of a series of studies comparing FCEI for children who are DHH when services are delivered through telepractice and in-person. The thesis comprises six chapters including this introduction, three peer reviewed journal articles, one manuscript for a journal article which is under review by a peer-reviewed journal, and a conclusion. The structure of the thesis is as follows:

Chapter 1: Introduction

This introductory chapter, which provides the background and context for the studies.

Chapter 2: Literature Review

Chapter 2 presents the findings from a scoping review of the literature regarding the use of telepractice in the delivery of FCEI to children who are DHH, and their families. Article 1 is presented in Chapter 2 accompanied by updated search results to 1 July 2020.

Previously published as:

McCarthy, M., Leigh, G., & Arthur-Kelly, M. (2019). Telepractice delivery of familycentred early intervention for children who are deaf or hard of hearing: A scoping review. *Journal of Telemedicine and Telecare*, 25(4), 249-260. doi:10.1177/1357633X18755883

Chapter 3: Practitioners' self-assessed use of family-centred practices

Article 2 appears in Chapter 3 and is titled "Practitioners' self-assessment of familycentred practice in telepractice versus in-person early intervention". This article addressed practitioners' use of family-centred practices in early intervention for children who are DHH. The article also presented findings from a study examining practitioners' self-assessment of their use of family-centred practices. Chapter 3 addresses Study 1. Previously published as:

McCarthy, M., Leigh, G., & Arthur-Kelly, M. (2020b). Practitioners' self-assessment of family-centred practice in telepractice versus in-person early intervention. *The Journal of Deaf Studies and Deaf Education*. Advance online publication. doi:10.1093/deafed/enaa028

Chapter 4: Caregivers' self-efficacy and involvement

Article 3 appears in Chapter 4 and is titled "Comparison of caregiver engagement in telepractice and in-person family-centered early intervention". This article explored the importance of caregiver involvement in FCEI for children who are DHH. This article also reported findings from a study examining caregivers' reported levels of self-efficacy and involvement in FCEI. This chapter addresses Study 2.

Previously published as:

McCarthy, M., Leigh, G., & Arthur-Kelly, M. (2020a). Comparison of caregiver engagement in telepractice and in-person family-centered early intervention. *The Journal of Deaf Studies and Deaf Education*, 25(1), 33-42. doi:10.1093 /deafed/enz037

Chapter 5: Triadic Intervention

Chapter 5 considers the family-centred behaviours demonstrated by practitioners and caregivers within an early intervention setting, and the relationships formed as a result of those behaviours. Article 4 is included in Chapter 5 as a manuscript submitted for publication and reports the findings of a study analysing systematic and detailed observations of the behaviours of both practitioners and caregivers as participants in

FCEI. The findings from Article 4 are supplemented with additional data analysis regarding participant interactions. The contents of Chapter 5 address Study 3.

Currently under review:

McCarthy, M., Leigh, G., & Arthur-Kelly, M. (2020c). Comparison of observed participant behaviors in telepractice and in-person early intervention.
Manuscript submitted for publication.

Chapter 6: Discussion

The final chapter in this thesis provides an overview of the key findings of the research as well as commentary on the strengths and limitations of the studies. The significance of the research, implications for practice, and recommendations for future research are also discussed.

1.7 Research ethics

Ethics approval for the studies contained in this thesis was sought and obtained from the University of Newcastle Human Research Ethics Committee (approval number H-2015-0205). Minor variations to the original application were submitted and approved in August 2016 (changes to recruitment process) and June 2017 (adjustment of inclusion criteria) (see Appendix B).

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter presents a summary of the research literature related to the use of telepractice to provide FCEI to children who are DHH and their families. Article 1 reports the results of a scoping review, which established the context, and provided the rationale and research questions for the combination of studies reported in this thesis. Given the time that elapsed since the publication of the review, an updated search of the literature was conducted using the search methods outlined in Article 1. The supplementary results are presented in this chapter to provide additional detail and recent information that was not available when Article 1 was published. In addition, this chapter outlines the significance and aims of the overall research program, and the research questions that were addressed.

2.2 Article 1: Telepractice delivery of family-centred early intervention for children who are deaf or hard of hearing: a scoping review

The first article in this thesis describes a scoping review that examined the prevailing research literature in the field of early childhood intervention for children who are DHH. The purpose of this scoping review was threefold; (a) to describe the use of telepractice in this highly specialised field, (b) to examine whether, and how, the effectiveness of telepractice was evaluated, and (c) to identify any additional information available about the use of telepractice with regard to early childhood intervention for children who are DHH. The scoping review was conducted using a framework outlined by the Joanna Briggs Institute, and the search process resulted in the inclusion of 23 peer-reviewed publications in the final review. The discussion

section of the article outlined the existing evidence on the use of telepractice, as well as gaps in the evidence base.

Article 1 included within this chapter is the final version of the original article published in *The Journal of Telemedicine and Telecare*.

Citation:

McCarthy, M., Leigh, G., & Arthur-Kelly, M. (2019). Telepractice delivery of familycentred early intervention for children who are deaf or hard of hearing: A scoping review. *Journal of Telemedicine and Telecare*, 25(4), 249-260. doi:10.1177/1357633X18755883
Telepractice delivery of family-centred early intervention for children who are deaf or hard of hearing: A scoping review

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Melissa McCarthy^{1,2}, Greg Leigh^{1,3} and Michael Arthur-Kelly²

Abstract

Introduction: The use of telepractice, a method of delivering services through telecommunications technologies that provides two-way, synchronous audio and video signals in real-time, is becoming increasingly commonplace in early childhood education and intervention for children who are deaf or hard of hearing. Although the use of telepractice has been validated in the health sector as a viable and effective alternative to in-person service provision, evidence to support its use in the delivery of family-centred early intervention is still emerging. The purpose of this scoping review was to describe the current use of telepractice in the delivery of family-centred early childhood intervention for children who are deaf or hard of hearing, and their families.

Method: The review followed the framework outlined by the Joanna Briggs Institute (2015), including an iterative three-step search strategy. Specific inclusion criteria and data extraction fields were outlined in advance.

Results: A total of 23 peer-reviewed publications were included in the review. Most publications (70%) provided anecdotal evidence of the challenges and benefits associated with telepractice. The remaining publications (30%) reported on research studies evaluating the effectiveness of early intervention delivered through telepractice. Of the 23 included papers, 18 viewed the use of telepractice positively while the remaining 5 reported mixed conclusions and the need for more data.

Discussion: Current evidence in the literature indicates that telepractice can be an effective model for delivering familycentred early intervention for children who are deaf or hard of hearing. However, more research is needed to substantiate the use of telepractice as a viable alternative to traditional in-person services, rather than being seen as supplemental to such services.

Keywords

Telepractice, deaf/hard of hearing, family-centred, early intervention, telehealth, tele-intervention

Date received: 29 November 2017; Date accepted: 3 January 2018

Introduction

The use of telepractice, the provision of services through technologies using two-way, synchronous audio and video signals, is becoming increasingly commonplace in early childhood education and intervention, particularly for children who are deaf or hard of hearing (D/HH).1-4 The shift to telepractice has been supported by an increasing pool of evidence in the health sector that validates the use of telepractice as an alternative to 'in-person' services where practitioner and client are located in the same room.5-13 The reported benefits of telepractice, including improved access to services, more efficient use of time, and reduction in travel costs, have been identified as reasons for its swift uptake in the field of early intervention.¹⁴⁻¹⁷ Despite the widespread use of telepractice in service delivery for children who are D/HH, much of the literature in this domain is based on anecdotal experience. A dedicated monograph,¹⁸ for example, focused on the current knowledge surrounding the use of telepractice to deliver audiology, speech pathology and early intervention services to children who are D/HH and concluded that there was a need for more empirical evidence to support anecdotal indicators of success.²

More systematic examinations of the literature can be found in related allied health fields such as audiology and speech pathology. Detailed reviews¹⁹⁻²² have provided support for the use of telepractice, however, the selected papers focused primarily on clinical aspects of screening,

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identification, assessment and monitoring rather than the provision of ongoing family-centred early childhood intervention. Molini-Avejonas and colleagues²² reported demonstrable advantages of telehealth over the use of non-telehealth approaches. Nevertheless, only a very small number of the included papers involved children under six years-of-age.²² In contrast, two telepractice reviews^{23,24} placed a particular emphasis on services for infants, toddlers and school-age children, but the selected papers describing the provision of early intervention services focused on children with disabilities other than hearing loss.

In the field of early childhood intervention, several literature reviews of best practices have been published²⁵⁻²⁷ along with guidelines and recommendations,^{28,29} including an international consensus statement on best practices in family-centred early intervention for children who are D/HH.³⁰ While all of these papers were inclusive of children who are D/HH, none of them addressed the use of telepractice models. In parallel, three literature reviews³¹⁻³³ specifically investigated the use of telepractice in early intervention, but these did not focus on children who are D/HH.

To date, there has been no integrated examination of the literature that considers telepractice, family-centred early childhood intervention, and the involvement of children who are D/HH, and their families. The objective of this scoping review, therefore, was to describe the current use of telepractice for the delivery of family-centred early childhood intervention for children who are D/HH, and their families. The questions to be addressed were defined as follows:

- What is known from the existing literature about the use of telepractice methods to provide family-centred early intervention services to children who are D/HH, and their families?
- To what extent does the existing literature address the effectiveness of telepractice models and what techniques were used to evaluate effectiveness?
- What additional information has been reported about the use of telepractice and how was that information determined?

Methods

This scoping review followed the framework outlined by the Joanna Briggs Institute (JBI), a centre for research and development affiliated with the Faculty of Health Sciences at the University of Adelaide, South Australia.³⁴ The JBI approach to scoping reviews builds on the work of Arksey and O'Malley³⁵ and Levac, Colquhoun and O'Brien,³⁶ and is based on the setting of a review question that clearly identifies population, concept and context, an a priori protocol of inclusion/exclusion criteria, and an iterative three-step search strategy.³⁴

Search strategy

Based on the recommendations of JBI, a three-step search strategy was utilized.³⁴ The first step included a search of ProQuest and EBSCO Megafile Ultimate and analysis of keywords from citations retrieved. The second step involved the refinement of search terms and a revised search across all four selected databases: ProQuest, CINAHL Complete, Scopus and SAGE Journals online. The third step included a search of reference lists of included articles. In addition, a manual search of a dedicated telepractice monograph was undertaken.

Development of search strategy. The preliminary search of ProQuest and EBSCO Megafile Ultimate databases was undertaken to assess the sensitivity of the search terms. Initial search criteria included the following terms: ("early intervention") AND (telepractice OR telemedicine OR telehealth) AND (deaf OR hearing). This approach returned a large number of extraneous results that listed references or journal titles containing the word hearing, but did not include content related to the review topic. Revised search criteria yielded more relevant results but still returned a number of papers that did not specifically relate to the provision of family-centred early intervention. After reviewing the proposed search terms, analysing initial results and discussing the purpose of the review, the authors decided to add a search term related to familycentred practice in order to yield more precise results. Title and abstract keywords from retrieved papers were analysed to determine if a secondary search of alternate terms was required, and the words videoconference, videoconferencing and tele-intervention were identified. The resulting search terms and methods are outlined below. See Table 1 for iterative search terms.

Selection of studies

The selection of studies for inclusion was determined through a title and abstract review of all retrieved citations. Where inclusion/exclusion could not be determined from title and abstract, or where an abstract was not available, a full-text review was undertaken. Duplicate papers were excluded. See Figure 1 for details of the selection process.

Inclusion criteria. The inclusion criteria required that literature (a) was written in English, (b) was published in peerreviewed journals from 1 January 1996 to 1 July 2017, and (c) specifically provided information about the use of telepractice to deliver family-centred early intervention to children who are D/HH, and their families. Dissertations were included if the title or abstract met the inclusion criteria.

Title and abstract screening. The first author screened the title and abstract of each citation for search terms and relevance. All articles were categorised as (a) included,

Table 1. Specific search terms used.

Proposed search terms	("early intervention") AND (telepractice OR telemedicine OR telehealth) AND (deaf OR hearing)
Revised search terms	("family-centered" OR "family centered" OR "family-centred" OR "family centred") AND ("early intervention") AND (telemedicine OR tele-medicine OR telehealth OR tele- health OR telepractice) AND (deaf OR "hard of hearing" OR "hearing impaired" OR "hearing loss")
Secondary search terms	("family-centered" OR "family centered" OR "family-centred" OR "family centred") AND ("early intervention") AND (videocon- ferenc* OR tele-intervention OR teleinter- vention) AND (deaf OR "hard of hearing" OR "hearing impaired" OR "hearing loss")

*the asterisk represents a truncation symbol used in searches to capture variations such as videoconference OR videoconferences OR videoconferencing (b) excluded or (c) requiring full-text review. As a crosscheck, the second and third authors received a stratified sample of 20% of the search results from categories a, b and c above and independently reviewed the information for consistent application of inclusion/exclusion criteria.

Review of complete papers. The full-text was obtained for articles that did not have an abstract available or whose inclusion/exclusion could not be determined from the screening process. In addition, the full-text was obtained for all citations considered eligible for inclusion after the initial screening. Following detailed review, a number of papers were excluded because they failed to meet the inclusion criteria.

Manual searches. More than 15% of the search results derived from a single source: a 2012 Volta Review Monograph. Based on this significant contribution, the entire volume was reviewed to ensure no articles had been overlooked in the database search. In addition, the reference lists of included articles were reviewed to identify any additional, relevant studies. A total of 13 articles were



Figure 1. Flow chart of citation selection process.

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identified for further review and, of these, six specifically described the use of telepractice to deliver early intervention programmes to children who are D/HH and their families.

Independent review. As a further check, an expert academic in the field of special education and disability reviewed a stratified random sample of the results. The reviewer had no affiliation with this paper or the overall research project. Full-text versions of 50% of the eligible search results were provided along with the specified inclusion/exclusion criteria. There was 85% interrater agreement between the authors' decisions and those of the reviewer. Where there was disagreement, the authors reconsidered the articles and, in one case, revised their decision based on the reviewer's feedback.

Data characterization

The following data were extracted from each included article: (a) journal title, year of publication and country where the study was conducted; (b) aims of the study; (c) sample size and participant information; (d) frequency, duration and type of intervention; (e) telepractice information (setting, equipment, participant training); (f) evaluation methods and measures; and (g) outcomes, key findings, conclusions and limitations.

Results

The database search yielded 91 citations. After exclusion of duplicates and limiting by source, 66 papers remained. Based on title and abstract review, 25 were considered eligible for inclusion. Subsequent examination of the full-text excluded eight articles. Following searches of reference lists and secondary search terms, an additional 6 articles were identified, resulting in a total of 23 papers in the final review, including one dissertation. See Appendix A for details of included articles.

General characteristics

The final results comprised 23 papers. The majority (16) were anecdotal, with authors providing a descriptive overview of an existing telepractice model. In this category, four papers^{1,17,37,38} described the telepractice programme at the Royal Institute for Deaf and Blind Children (RIDBC) in Sydney, Australia, and four papers³⁹⁻⁴² described the programme at Sound Beginnings in Utah, the United States. Eight papers described a programme in each of six US states (Colorado,⁴³ Ohio,⁴⁴ Missouri,⁴⁵ Texas,⁴⁶ Washington,⁴⁷ and Wisconsin⁴⁸), and two Australian states (New South Wales⁴⁹ and Victoria⁵⁰). The remaining seven papers included three pilot projects conducted in Australia,⁵¹ South Africa⁵² and the United States;⁵⁶ and one dissertation⁵⁷ completed in the United States.

Table	2.	Journal	distribution.
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Journal name	Number of articles
Australian Journal of Education of the Deaf	1
Deafness and Education International	1
Infants and Young Children	1
International Journal of Telerehabilitation	1
Journal of Telemedicine and Telecare	3
Pediatrics	1
Perspectives on Hearing & Hearing Disorders in Childhood	1
Perspectives on Telepractice	1
Telecommunications Journal of Australia	1
Volta Review	П

Publication date distribution. There were no papers published prior to 2001 that met the inclusion criteria. One paper was published in 2001, 2008, 2013, and 2017. Two papers were published in 2010, 2011, 2014 and 2015. Eleven papers were published in 2012.

Journal distribution. The search results included a dissertation indexed in Proquest but not published in a specific journal. The remaining 22 articles were published in a range of journals from disciplines including health, education, deafness, technology and telemedicine. Table 2 further describes the search results by journal.

Methodological characteristics

All 23 papers reported on cohorts of children who were D/ HH ranging from birth to 79 months and their caregivers. In eight cases, $^{39,45,51-54,56,57}$ practitioners were included as participants. Sample sizes ranged from 2 families to more than 170 families, and practitioner cohorts ranged from 1 to 27 participants. The 23 papers varied in terms of which participants were the target of investigation. Papers evaluated outcomes for (a) children, (b) caregivers, (c) practitioners or (d) a combination of these groups. More detail can be found in Appendix A.

Reported outcomes measures and evaluation methods differed across the 23 papers. Programmes were evaluated through unsolicited feedback, interviews, questionnaires, technology satisfaction surveys, and checklists. Participant outcomes were measured using standardized assessments, language sampling, observation, and analysis of video-recorded sessions. Seven papers⁵¹⁻⁵⁷ described specific evaluation methods while three papers37,45,49 reported on an annual evaluation process. Five papers^{1,38,39,44,48} referred broadly to the administration of child assessment protocols or parent surveys but did not specify particular methods or outcomes. Five papers40-43,46 reported improved parent skills and/or child outcomes but did not elaborate on the method of evaluation. The remaining three studies^{17,47,50} reported

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the benefits of telepractice generally, including improved access to services and increased contact between participants.

The reported pattern of service delivery differed among providers. Fourteen papers^{1,37,38,40-49,57} stated that sessions were delivered exclusively through telepractice, although half of these reported the use of in-person visits to develop rapport or conduct assessments.^{1,37,43,44,46,48,49} Consequently, seven models could be described as telepractice only, while the other seven were characterized as augmented. One additional paper⁵⁶ specifically mentioned the use of in-person sessions for a small percentage of service delivery. The remaining eight papers^{17,39,50-55} described a blended model of service provision with in-person sessions comprising at least 25% of service delivery.

Of the 23 papers, less than one-third mentioned the provision of telepractice training for either practitioners or caregivers.^{38-40,42-44,53} Three papers^{38,43,53} specified the content and duration of telepractice training provided to staff. One paper³⁹ referred to specific telepractice training provided by an external organisation while another⁴⁴ indicated that staff training was provided, but neither of these papers specified the content or structure of the training programmes. Two papers^{40,42} mentioned the availability of self-directed, online tutorials from equipment manufacturers but did not mandate their use.

Content analysis

Following data extraction, papers were examined thematically. The authors reviewed the aims/purpose, outcomes, key findings, conclusions and limitations of each study to identify recurring topics. The following themes were subsequently identified.

Rationale for telepractice services. All papers aimed to provide support (either anecdotal or research-based) for the use of telepractice in family-centred early intervention programmes for children who are D/HH. The overarching rationale indicated by all papers was a lack of equitable access to services resulting from the inherent nature of a low-incidence disability such as deafness. The uneven distribution of children who are D/HH across a relatively small number of locations has led to high costs of establishing local services, unsustainable travel costs for outreach services and unreasonable demands of travel time for practitioners and families. Other reasons identified in support of telepractice included increased demand for services resulting from earlier identification of hearing loss, a shortage of qualified practitioners and geographic barriers to access.

Challenges associated with telepractice. Technical difficulties were frequently cited as challenges, including lack of high-speed broadband networks, unreliable Internet connections, and limited Information Technology (IT) support. Funding was identified as another challenge, including the purchase and maintenance of technical infrastructure, and reimbursement practices that did not compensate for the use of telepractice. Finally, staff issues associated with increased preparation time and additional training were also identified as potential challenges.

Benefits of telepractice. Telepractice was reported to eliminate the constraints of distance and travel. Families and local professionals were able to access specialist providers through telepractice, irrespective of their individual locations. The ability to schedule sessions outside of standard work hours and/or the relative ease of rescheduling a telepractice session in comparison to an in-person session was frequently reported as a benefit. Telepractice was also seen as providing greater flexibility in overcoming potential barriers to attendance, including weather conditions or family illnesses that may contraindicate travel. Another reported benefit was the reduction in time spent travelling to and from appointments. In many cases, the flexibility in scheduling and reduction in travel were argued to be associated with a reduction in the number of missed sessions, which was, in turn, argued to be associated with a reduction in the cost of service delivery.

One final area of reported benefit was that telepractice promoted an enhanced level of family-centredness. Telepractice was argued to expand parental choice of provider, intervention approach and communication mode by improving access to a range of specialist providers. Practitioners described increased engagement from the primary caregiver as well as incidental participation from siblings or other members of the family. Telepractice was also reported to create an environment that promoted practitioners' use of coaching techniques to support caregivers' mastery of new skills.

Feasibility of telepractice. A number of papers documented the feasibility of telepractice as a method of service delivery. These appraisals primarily measured technology function and participant satisfaction with the mode of service delivery. In some cases, extrapolated information about cost effectiveness was included. These feasibility studies provided a foundation for the more detailed effectiveness studies outlined in the next section.

Effectiveness of telepractice-delivered interventions. A few papers acknowledged the overall feasibility of the telepractice mode and sought to examine the effectiveness of the actual intervention delivered. Programmes that reported on effectiveness explored four main areas: child language outcomes, practitioner and parent beliefs, practitioner behaviours, and parent-child interactions.

Discussion

This scoping review examined the current use of telepractice to deliver family-centred early intervention services to children who are D/HH, and their families. Results supported the view that telepractice use in this field has grown significantly over the last 20 years. In spite of this growth, there continues to be significant variation in the terminology, technology and implementation of telepractice across the reviewed literature, suggesting that models are still emerging.

The use of telepractice was viewed positively in the majority of papers with several reporting mixed conclusions. These five papers^{1,42,49,50,56} suggested that, although early results were encouraging, more data was required. Three of these papers^{49,50,56} specifically suggested that telepractice could only supplement, but not replace, in-person sessions. Overall, the potential benefits of telepractice were universally acknowledged, including the potential for improved quality of services, increased access to services and an enhanced level of family-centredness.

The majority of papers meeting criteria for this review provided anecdotal descriptions of telepractice use with children who are D/HH. These 16 reports^{1,17,37-50} highlighted the perceived challenges and benefits of telepractice models and evaluated the feasibility of telepractice methods using questionnaires, surveys, interviews and observations. Although these evaluation methods provided useful information about the practicality of telepractice models, they did not specifically address the effectiveness of telepractice in delivering family-centred early intervention.

The remaining seven papers in this review⁵¹⁻⁵⁷ described research studies that attempted to examine the effectiveness of telepractice interventions compared to inperson interventions. These studies shared a number of limitations. The first related to technical difficulties that restricted participants' ability to effectively access telepractice services or required a significant modification to the timing or duration of their usual service. The second limitation concerned training in the use of telepractice. Minimal information was presented about the duration, content or structure of telepractice training programmes provided to staff or families. The third limitation related to participant selection including small sample sizes, and issues associated with self-selection and convenience sampling. A notable exception in this regard was the Behl et al. study⁵⁶ that included a much larger sample size (n=48) than other studies. However, their sample was geographically dispersed across five programmes in five US states with each individual programme responsible for recruitment, consent, and administration of the research protocol, with potential discrepancies between programmes. In this way, the results may be considered as relating to five smaller samples. The fourth and final limitation among the seven research papers related to the individual programme definitions of telepractice, which varied from study to study with regard to participants, frequency, duration, and period of intervention. In some studies, for example, the child was involved only in every other telepractice session and the practitioner met with the caregiver alone for the remaining sessions. In many cases,

telepractice sessions were supplemented by in-person sessions. The frequency of in-person sessions ranged from quarterly to monthly and, in two studies,^{52,53} sessions alternated between in-person and telepractice delivery. For some participants, their first (and in some cases only) exposure to telepractice occurred during the study.⁵² All of these factors had the potential to influence participants' perception of the telepractice delivery mode and, consequently, impact on the reported findings of the studies.

Research implications

Although the overall impression gained from the literature in this review was one of positive support for the use of telepractice in early intervention programmes for children who are D/HH, and their families, the quality of available evidence varied greatly and discrepancies still exist in the evidence for the efficacy of telepractice as a stand-alone model. On the one hand, practitioners pointed to the potential benefits of telepractice as a unique model, but at the same time, only a third of the papers reported the exclusive use of telepractice. Research into the disparity between the stated benefits of telepractice and the actual implementation of telepractice is warranted.

In a similar way, individual preference was often reported as a determining factor in the use of telepractice. Researchers noted that attitudes towards telepractice were related to prior familiarity with in-person sessions and/or lack of familiarity with telepractice. While it is important to consider family preferences in determining delivery mode, future research should assess the potential impact of existing perceptions on participation and reported research outcomes. It also would be useful to investigate the impact of personal beliefs about service delivery on participants' perception of efficacy of service delivery and effectiveness of intervention. This is a particularly important consideration in future randomized studies to reduce or eliminate the bias of prior familiarity.

A number of other contradictions emerged that also require further investigation. First, the need for additional training was cited frequently as a disadvantage of telepractice, but very few studies reported the provision of training to practitioners or families, or the nature of the training that was likely to be required. Research into the impact of training, or lack thereof, on the successful implementation of a telepractice model would be a valuable addition to the literature.

Second, telepractice was frequently argued to save time by reducing travel for practitioners and families, but a number of papers also indicated that telepractice presented additional demands on time for preparation, planning and training. Likewise, many of the included papers asserted that telepractice provided cost savings, yet, in some cases, telepractice was deemed to increase costs due to the expense of technology and lack of appropriate

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reimbursement models. Still others indicated that additional funding had been required to establish a telepractice programme. Further research that precisely accounts for the positive and negative impacts on time as well as true expenditure and cost savings of telepractice models would be informative.

Third, current licensing and reimbursement regulations were developed prior to the emergence of telepractice, and unintended restrictions appear to be hindering its expansion. Research that investigates the constraints presented by licensing and reimbursement policies, the impact of those constraints on the implementation of telepractice models, and possible solutions for overcoming those barriers would contribute significantly to the existing literature.

Finally, a number of limitations were noted in the research studies included in this review. A significant limitation was the participants' level of familiarity with telepractice. In more than a third of the studies, the families' first experience with telepractice occurred during the study. While random assignment to a research group is an ideal construct, prior perceptions of service delivery mode may inadvertently influence research outcomes, as discussed above. A second limitation for this group of studies was the varied model of service delivery. Most families received a combination of telepractice and in-person sessions, which potentially limited the researchers' ability to draw conclusions about the effectiveness of services delivered solely through telepractice. Finally, practitioners' access to telepractice training and their experience in delivering telepractice services varied within and between studies. In some cases, the practitioner's first experience with telepractice occurred during the study. These methodological limitations should be considered in the development of future studies.

Strengths and limitations of this review

This scoping review used the prescribed method outlined by JBI. It followed a protocol that was regularly reviewed and modified by the research team. A three-step search strategy was employed to ensure a comprehensive literature search. Selection of studies included independent review by all three authors and a final check by an impartial reviewer. A predefined form was used to extract similar data from all papers.

Despite using a systematic search method, this review may have some limitations. The decision to include only peer-reviewed literature could mean that relevant sources published in non-commercial form, or indeed, unpublished materials, were not included. The exclusion of articles that did not have full-text available in English also may have excluded some potentially valuable information. The search strategy included a range of commonly used terms in the field, but given the variability of terminology and the emerging nature of telepractice, it is possible that alternate terms were inadvertently omitted from this review.

Conclusion and future directions

Telepractice is being used around the globe to deliver family-centred early intervention services to children who are D/HH and their families. Anecdotal evidence in the literature, including observation, professional judgement and participant feedback, indicates that telepractice is a feasible method for delivering these types of services. A handful of research studies have sought to compare the effectiveness of telepractice to in-person sessions with promising results. More research is needed to validate the use of telepractice as a viable alternative, rather than a supplement, to traditional in-person services. Studies that include larger cohorts, participants with greater familiarity with the telepractice model, services delivered primarily through telepractice rather than in-person, and programmes with consistent staff training would contribute valuable evidence to the growing literature in this area.

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Supplementary material

Supplementary material is available for this article online.

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Authors	Year	Category	Sample size	Enrolment dístribution	Frequency/ duration of intervention	Technology/connection	Pattern of service delivery
Behl et al.	2017	Research study	48 families (25 in-person and 23 telepractice); 15 practitioners	five programs in five US states	Mean of 3.74 visits per month over a 6-month period	Computer or tablet device with internet-based soft- ware/ "adequate internet connectivity"	Augmented: In-home telepractice sessions supplemented with 10% in- person visits
Blaiser et al.	2013	Pilot project	27 families (14 in-person and 13 telepractice); 9 practitioners	one program	Mean of 2 visits per month over a 6-month period	Computer with free internet- based software/high speed internet	Blended: In-home telepractice sessions alternating with home visits
Blaiser et al.	2012	Program description	2 families	one program	weekly/not specified	Dedicated videoconferencing equipment or computer with free internet-based software/ "adequate bandwidth"	Blended: In-home telepractice sessions with one in-person visit each month
Broekelman	2012	Program description	not specified	one program	not specified	Proprietary, non-commercial HIPAA and FERPA compli- ant software/high-quality internet connection	Telepractice only: In-home or community-based telepractice sessions
Brown	2015	Doctoral research	16 practitioners	eight programs in six US states	not specified but each practitioner provided one recorded session	not specified	Telepractice only: One telepractice session per family
Brown and Remíne	2008	Research study	24 families (16 in-person and 8 telepractice); 27 practitioners	one program	not specified	not specified	Augmented: Community-based telepractice sessions sup- plemented with occasional in-person visits
Constantinescu	2012	Pilot project	13 caregivers; 5 practitioners	one program	One hour per week/at least six months	Computer with free internet-based software/ high-speed broadband	Augmented: In-home telepractice sessions alternating between one hour with child and parent then one hour with parent only: supplemented with at least four in-person visits per year
Constantinescu et al.	2014	Research study	14 children (7 in-person and 7 telepractice)	one program	40 fortnightly sessions over a 2-year period	Computer with free internet-based software / not specified	Augmented: In-home telepractice sessions alternating between one hour with child and parent
							(continued)

Appendix A – Characteristics of included articles

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Continued							
Authors	Year	Category	Sample size	Enrolment dístribution	Frequency/ duration of intervention	Technology/connection	Pattern of service delivery
							then one hour with parent only: supplemented with at least two in-person visits every six months
Davis et al.	2012	Program description	45 families	one program	weekly, biweekly, or monthly basis, deter- mined by individual need/not specified	Computer with free internet-based software / not specified	Augmented: Augmented: In-home telepractice sessions supplemented with in- person assessment and annual residential
Douglas	2012	Program description	not specified	one program	weekly/not specified	Computer with free internet-based software / high-speed Internet	Augmenter Augmentelepractice sessions In-home telepractice sessions supplemented with in- person assessment and evaluations
Flett	2001	Program description	4 families	one program	weekly or fortnightly over a 2-year period	Computer with videoconferencing capability/ISDN	Augmented: In-home or community-based telepractice sessions focused on child observa- tion and team meetings supplemented with at least five in-person visits each year
Galvan et al.	2014	Program description	not specified	one program	weekly/not specified	Computer with proprietary software/broadband internet	Augmented: In-home telepractice sessions supplemented with in- person assessment and evaluations
Hamren and Quigley	2012	Program description	not specified	one program	not specified	Dedicated videoconferencing equipment/high speed broadband	Telepractice only: In-home telepractice sessions
Havenga et al.	2017	Pilot project	10 families; I practitioner	one program	Two sessions in three- week period	Computer or tablet device with free internet-based software/fixed line or 3G cellular network	Blended: One 30 min session (either telepractice or in-person) then one 30 min session in the alternate mode two weeks later
Houston	2011	Program description	2 families; I practitioner	one program	weekly sessions of 60-75 minutes/not specified	Dedicated VC equipment/ high speed broadband at practitioner site, family site not specified	Telepractice only: In-home telepractice sessions
							(continued)

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Authors	Year	Category	Sample size	Enrolment distribution	Frequency/ duration of intervention	Technology/connection	Pattern of service delivery
Houston	2010	Program description	not specified	one program	weekly for 18 months	Dedicated VC equipment/ high speed internet connections	Telepractice only: In-home telepractice sessions
Houston and Stredler-Brown	2012	Program description	not specified	one program	weekly sessions of 60-75 minutes/not specified	Dedicated VC equipment/ high speed internet connections	Telepractice only: In-home telepractice sessions
Lalios	2012	Program description	II families	one program	not specified	Computer with free internet- based software /differing Internet connections, e.g., wired, wireless, satellite	Augmented: In-home or community-based telepractice supplemented with in-person assessments
McCarthy	2011	Program description	97 families from one program	one program	weekly/not specified	Dedicated videoconferencing equipment/high speed internet connections	Telepractice only: In-home or community-based telepractice sessions
McCarthy	2012	Program description	7 famílies	one program	one hour weekly/not specified	Dedicated videoconferencing equipment/high speed internet connections	Augmented: In-home telepractice sessions with an in-person visit rec- ommended annually
McCarthy et al.	2012	Program description	3 children	one program	weekly/not specified	Computer with free internet- based software or dedi- cated videoconferencing equipment/not specified	Blended: Three-month residential stay followed by in-home tele- practice sessions
McCarthy et al.	2010	Program description	more than 170 families	one program	one hour weekly/not specified	Dedicated videoconferencing equipment/not specified	Augmented: In-home telepractice sessions with an in-person visit rec- ommended initially
Stith et al.	2012	Program description	2 children; I practitioner	two programs in two US states	Child I: weekly sessions for two months Child 2: weekly sessions for 14 months	Child 1: Dedicated videocon- ferencing equipment/"reli- able broadband" Child 2: Computer with free internet-based software/ high-speed internet connection	Child 1: Augmented Community-based teleprac- tice supplemented with in- person sessions and assessment Child 2: Blended In-home telepractice sessions supplemented with weekly in-person sessions by another practitioner

Continued

2.3 Updated literature search

A secondary search of the literature was conducted using the same search and selection process that was outlined in the methods section of the original scoping review (see McCarthy et al., 2019, p. 250). The aim of the search was to identify peer-reviewed publications that were published in English between 1 July 2017 and 1 July 2020, and specifically provided information about the provision of FCEI to children who are DHH through telepractice. The search terms that were defined in the original scoping review (see Table 2.1), were used to search four databases: ProQuest, EBSCO Megafile Ultimate, SAGE, and Scopus.

Table 2.1Search Terms for Updated Literature Search

Search terms	("family-centered" OR "family-centered" OR "family centred" OR "family centred") AND ("early intervention")
	AND (telemedicine OR tele-medicine OR telehealth OR tele-health OR telepractice OR teleintervention OR tele-intervention)
	AND (deaf OR "hard of hearing" OR "hearing impaired" OR "hearing loss")

The database search returned 25 results, and after screening and review, three articles were identified that met the requirements for inclusion (see Figure 2.1 for details of the selection process). One of the identified studies (McCarthy, Leigh, & Arthur-Kelly, 2020a) is an article that forms part of this thesis, and is explored in more detail in Chapter 4. At the time of this supplementary literature review, the article reported in Chapter 3 (McCarthy, Leigh, & Arthur Kelly, 2020b) was not published. It is noted that, had it been so, it would also have met the criteria for inclusion. The reference lists of the included articles were reviewed to identify any other relevant studies, resulting in one further study being identified. Ultimately, four additional studies met the inclusion

criteria (Chen & Liu, 2017; Daczewitz, Meadan-Kaplansky, & Border, 2020; Fuller & McLeod, 2019; McCarthy et al., 2020a).



Figure 2.1. Flow chart of citation selection process.

2.3.1 General characteristics

The four articles identified in this literature search described specific projects or studies that investigated the use of telepractice with families of children who are DHH,

including one anecdotal description of a telepractice model (Fuller & McLeod, 2019) and three research studies (Chen & Liu, 2017; Daczewitz et al., 2020; McCarthy et al., 2020a). The investigations reported in the articles were conducted in three different countries: two in Australia (Fuller & McLeod, 2019; McCarthy et al., 2020a), and one in each of the United States (Daczewitz et al., 2020) and Taiwan (Chen & Liu, 2017). The articles were published in three different journals: two were published in *Deafness and Education International* (Daczewitz et al., 2020; Chen & Liu, 2017), one was published in the *Journal of Deaf Studies and Deaf Education* (McCarthy et al., 2020a), and one was published in the *Australian Journal of Music Therapy* (Fuller & McLeod, 2019). See Table 2.2 for summary details of the four included articles.

2.3.2 Methodological characteristics

All four articles reported on cohorts that included children who were DHH and their caregivers, however the target of investigation varied across studies. Caregiver outcomes were evaluated in four studies, practitioner experiences were evaluated in two studies (Chen & Lieu, 2017; Fuller & McLeod, 2019), and specific child outcomes were evaluated in two studies (Chen & Lieu, 2017; Daczewitz et al., 2020). This variation in target population also influenced the study design and evaluation methods of each project. The study by Fuller and McLeod (2019) was conducted for the purpose of program quality assurance and used incidental verbal feedback and organisational evaluation surveys to obtain information about practitioners' and caregivers' experiences with telepractice. McCarthy et al. (2020a) reported on a two-group comparison study using an existing instrument to examine different caregivers' self-reported levels of self-efficacy and involvement in telepractice and in-person settings. The study by Chen & Liu (2017) measured child language outcomes using the results of a standardized language assessment to conduct a retrospective comparison of matched

Table 2.2 <i>Characteri</i>	stics of a	dditional art	ticles				
Authors	Year	Location	Study design	Sample size and setting	Frequency/ duration of intervention	Technology/internet connection	Outcome measures
Chen & Liu	2017	Taiwan	Retrospective comparison of matched pairs	 10 children (5 in-person and 5 telepractice); 5 caregivers (telepractice); 4 practitioners (telepractice) 	Weekly sessions for 1 hr; Mean enrolment = 50 months	Computer with proprietary internet- based software/ internet type not specified	Revised Preschooler Language Assessment; Parent/Therapist Satisfaction Questionnaire (Constantinescu, 2012)
Daczewitz et al.	2020	USA	Single case multiple baseline across teaching strategies	 child (telepractice); caregiver (telepractice) 	Total of 29 sessions of 15-25 min over 12 weeks	Computer or smartphone with free internet-based software/ high speed cable internet	Coding of caregiver teaching strategies and child behaviours; post- intervention survey and interview; cost-benefit analvsis
Fuller & McLeod	2019	Australia	Quality assurance	 21 families^a (10 in-person, 7 telepractice, and 4 both); 7 practitioners (telepractice) 	Group 1-1 session of 45 min Group 2 – 6 sessions of 45 min each Group 3- 5 sessions of 45 min each ^b	Practitioners – Dedicated videoconferencing equipment Families – Computer or tablet device with proprietary software/internet type not specified	Incidental verbal feedback and program- specific evaluation form
							(continued)

(continued)

McCarthy	2020a	Australia	Two-group	141 caregivers	Weekly sessions	Interactive	Scale of Parental
et al.			comparison	(100 in-person,	for 1 hr; 84% had	videoconferencing	Involvement and Self-
				41 telepractice)	been enrolled for	technology/high-speed	Efficacy; Demographic
					12 months or	internet	questionnaire
					longer		

models. In Group 1 all families and 5 practitioners were in-person in the same location while 2 practitioners delivered the intervention through telepractice; In Group 3 all families and 1 practitioner were in-person in the same location for all five sessions with the intervention delivered ^aExact participant numbers varied over the course of the intervention; ^bThe intervention in this study was provided through three different telepractice; In Group 2 each family participated from their individual home and connected with each other and 2 practitioners through by an additional practitioner in-person for the first and last sessions, and through telepractice for the remaining sessions. peers. That study also used an existing satisfaction questionnaire to evaluate practitioner and caregiver satisfaction with telepractice. Finally, Daczewitz and colleagues (2020) used a single case multiple-baseline design to investigate how intervention delivered through telepractice related to the caregiver's use of specific strategies and the child's responses, with participants serving as their own controls.

Sample sizes were small in three of the papers with cohorts variously including one caregiver-child dyad (Daczewitz et al., 2020); five caregivers, four practitioners, and five matched pairs of children (Chen & Liu, 2017); and approximately twenty-one caregivers (see notes to Table 2.2) and seven practitioners (Fuller & McLeod, 2019). The study by McCarthy et al. (2020a) included 141 caregivers. Patterns of service delivery differed widely across all four studies, ranging from multiple sessions in a week (Daczewitz et al., 2020) to a single session (Fuller & McLeod, 2019). Families in three studies accessed services from their home (Chen & Liu, 2017; Daczewitz et al., 2020; McCarthy et al., 2020a) whereas in the study by Fuller and McLeod (2019), families variously accessed services from a local centre or from their home. The technology used to deliver services in all four studies was similar with families using high-speed internet and software downloaded on their home computer or other device. The provision of technology training to parents was mentioned in two of the papers (Chen & Liu, 2017; Fuller & McLeod, 2019) and the availability of technical support was mentioned in one paper (McCarthy et al., 2020a).

2.3.3 Content analysis

Each of the four studies acknowledged the increasing acceptance and overall feasibility of telepractice as a means of providing family-centred services and recognised the need for further evidence to support the effectiveness of a telepractice model. Researchers cited advantages outlined in the literature as the basis for

implementing telepractice services, including increased access for rural families, greater reach for service providers, significant cost-savings associated with reduced travel, and more equitable distribution of services for children with low-incidence disabilities. Building on the existing evidence, all four studies sought to advance the field by examining the effectiveness of interventions delivered through telepractice. Different elements of the telepractice process were evaluated including child outcomes, caregiver outcomes, fidelity of intervention, and delivery of group programs.

Each of the four additional studies reported findings that support the conclusion that telepractice can be an effective method for delivering early intervention services to children who are DHH and their families. In terms of caregiver outcomes, two of the studies evaluated caregiver satisfaction (Chen & Liu, 2017; Daczewitz et al., 2020) and two examined caregiver engagement (Fuller & McLeod, 2019; McCarthy et al., 2020a). Chen and Liu (2017) and Daczewitz et al. (2020) both reported high levels of caregiver satisfaction with telepractice. McCarthy et al. (2020a) reported no significant differences between telepractice and in-person groups regarding caregivers' selfefficacy and involvement whereas in the study by Fuller and McLeod (2019), caregivers reported increased engagement in telepractice sessions relative to in-person sessions, but expressed concerns about technical difficulties and the ability for their individual needs to be addressed in a group telepractice setting. In the two studies that assessed practitioner outcomes, Chen and Liu (2017) reported high levels of practitioner satisfaction with telepractice whereas Fuller and McLeod (2019) reported mixed feedback with practitioners reporting higher levels of family participation but also concerns about building rapport. In the two studies that sought to evaluate child outcomes, Chen and Liu (2017) found no significant differences between their telepractice and in-person groups whereas Daczewitz et al. (2020) found outcomes

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varied for different aspects of the intervention. The single child participant demonstrated no significant change in vocabulary or language complexity, but the rate of responding behaviours increased steadily over the course of the telepractice intervention (Daczewitz et al., 2020).

Additional, and potentially unexpected, outcomes of telepractice intervention were identified in several papers. Chen and Liu (2017) found that, on average, caregivers rated their satisfaction with telepractice more positively than practitioners. Dazcewitz and colleagues (2020) reported that the flexible nature of telepractice service delivery enabled both the mother and the father in their study to participate more equitably in supporting their child's development. Fuller and McLeod (2019) reported that families experienced reduced feelings of isolation by participating in telepractice sessions.

Finally, with regard to technology, two of the additional studies reported technical difficulties (Daczewitz et al., 2020; Fuller & McLeod, 2019). In one study, the caregiver noted the obtrusiveness of the camera and the frustration of occasional technology breakdowns (Daczewitz et al., 2020). In the other, caregivers and practitioners reported various technology challenges including cessation or interruption of the video signal, poor audio quality, and latency issues related to signal transmission (Fuller & McLeod, 2019).

2.4 Overall conclusions from the literature reviews

Taken together, the original scoping review (Article 1), and the additional review reported here, examined 25 years of literature on the use of telepractice to provide FCEI to children who are DHH, and their families. The predominant aim of papers published between 1996 and 2012 was to provide a rationale for the acceptance of telepractice as a valid method of service delivery. The majority of papers published during that time offered anecdotal reports of program viability and reiterated the need for more systematic evaluation (McCarthy et al., 2019). Since 2012, researchers have responded to the call for evidence and an increasing number of papers have focused specifically on providing data to evaluate the effectiveness of services provided through telepractice.

The emergence of the COVID-19 pandemic in 2020 has heralded a further increase in the application of telepractice in line with the restriction on people's movements and their ability to physically interact with one another (Bashshur et al., 2020; Centers for Disease Control (CDC), 2020; National Association for the Deaf, 2020; Office of Special Education Programs, 2020; Smith et al., 2020; Wijessoriya et al., 2020). This has been particularly notable in the field of early intervention for DHH children and their families (Yoshinaga-Itano, 2020; CDC, 2020). The unprecedented need to implement telepractice models in the present era may benefit telepractice research in the future. As the use of telepractice becomes more commonplace in people's personal and professional experiences, many of the earlier limitations associated with telepractice studies (e.g., participants' lack of familiarity with telepractice and limited telepractice training) may be eliminated. Until recently, small sample sizes and inconsistent patterns of service delivery have been identified as the most significant limitations in telepractice research studies. The increase in the use of telepractice for early intervention services during 2020-and in all likelihood, for the foreseeable future—will result in the availability of much larger groups of both practitioners and caregivers from which many more participants may be sampled for research. These conditions may provide a more equitable basis for comparison with groups who receive services entirely in-person.

2.5 Statement of the problem

Children who are DHH, and their families, require early, timely, and consistent FCEI to achieve optimal developmental outcomes, but many families continue to experience inequitable access to necessary services (Arefadib & Moore, 2017; Barr et al., 2018; JCIH, 2013, 2019; Moeller et al., 2013). Telepractice has been increasingly applied as a method for overcoming existing barriers to access to FCEI for children who are DHH and their families and, according to the literature reviewed here, the practicality of using telepractice to provide early intervention services for this group has been well-documented. What is less apparent, however, is whether services provided through telepractice adhere to the principles of family-centred practice and achieve similar levels of caregiver support as those provided in-person.

2.6 Thesis Aims and Research Questions

The aims of the program of research reported in this thesis were to:

- 1. Examine and synthesise the current research literature addressing the use of telepractice in the field of FCEI for children who are DHH;
- Compare the patterns of practitioners' use of family-centred practices with children who are DHH and their families when early intervention services are delivered in-person and through telepractice;
- 3. Compare caregivers' patterns of engagement in FCEI for children who are DHH when services are delivered in-person and through telepractice; and
- Compare the relationships and interactions demonstrated by participant triads (practitioner, caregiver, and child) when FCEI is delivered in-person and through telepractice.

- following research questions:
 - 1. What is known from the existing literature about the use of telepractice methods to provide FCEI services to children who are DHH, and their families?
 - 2. Do practitioners report different patterns of use of family-centred practices when early childhood early intervention is delivered through telepractice versus inperson?
 - 3. Do caregivers' reported levels of self-efficacy and involvement differ when early intervention is delivered through telepractice versus in-person?
 - 4. What family-centred strategies do practitioners use when early intervention are sessions delivered through telepractice and in-person and do these strategies differ between delivery modes?
 - 5. What participation behaviours do caregivers demonstrate when early intervention sessions are delivered through telepractice and in-person and do these behaviours differ between deliver modes?
 - 6. Does the use of specific strategies by practitioners affect caregivers' participation behaviours when early intervention sessions are delivered through telepractice and in-person and does this relationship vary between delivery modes?
 - 7. What roles do participants (i.e., practitioners, caregivers, and children) fulfill in early intervention sessions for children who are DHH and does this differ when services are delivered in telepractice or in-person?
 - 8. What relationships are formed within practitioner/caregiver/child triads and do these relationships differ when services are delivered in telepractice or inperson?

2.7 Chapter summary and conclusion

Telepractice is being used increasingly as a means of delivering early intervention services to children who are DHH and their families who might otherwise be disadvantaged by the lack of availability, relevance, or quality of local service options. Extensive evidence has emerged to support the feasibility of telepractice as an alternative delivery strategy to the provision of in-person family-centred services by examining technical capabilities, participant satisfaction, and cost effectiveness. Building on this evidence, current telepractice research has shifted from a focus on reliability to one of quality with several studies investigating the effectiveness of interventions provided through telepractice compared to those provided in-person. It is apparent, however, that additional evidence is required to both corroborate those findings and add to the evidence base for the efficacy of telepractice for delivery of FCEI with this group. The studies reported in this thesis were designed to address these gaps by providing evidence related to (a) practitioners' use of family-centred practices, (b) caregivers' patterns of engagement, and (c) the interactions between practitioners and caregivers, within the context of FCEI sessions delivered through telepractice.

CHAPTER 3: FAMILY-CENTRED PRACTICES

3.1 Introduction

In FCEI, practitioners use family-centred practices to enhance caregivers' confidence, competence and involvement in their child's early development. When FCEI is delivered in-person, studies have shown that significant relationships exist between practitioners' use of family-centred practices, caregivers' self-efficacy, and children's developmental outcomes (Dunst et al., 2019; Harrison et al., 2016; Moeller et al., 2013). There is little evidence to indicate whether these relationships are affected when FCEI is delivered through telepractice. Article 2, which is included in this chapter, examined practitioners' use of family-centred practices when FCEI is provided through telepractice.

3.2 Article 2: Practitioners' self-assessment of family-centred practice in telepractice versus in-person early intervention

The second article presented in this thesis describes a comparative study designed to address Research Question 2: *Do practitioners report different patterns of use of family-centered practices when early childhood early intervention is delivered through telepractice versus in-person*? The study investigated practitioners' selfassessment of their use of family-centred practices in FCEI for children who are DHH. Study participants included two groups of practitioners—one providing FCEI in-person and the other through telepractice. Both groups completed the Measures of Processes of Care for Services Providers (MPOC-SP) (Woodside, Rosenbaum, King, and King, 1998). The article reports the study design, methods, and results as well as implications for practice and future research. Article 2 included in this chapter is the final version of the article published in The Journal of Deaf Studies and Deaf Education, reproduced by permission of Oxford University Press.

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Practitioners' Self-Assessment of Family-Centered Practice in Telepractice Versus In-Person Early Intervention

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Abstract

For infants and young children who are identified as deaf or hard of hearing (DHH), best practice principles indicate the provision of family-centered early intervention (FCEI). However, factors such as geographical inaccessibility and workforce shortages can limit families' access to FCEI in their local area. One strategy for overcoming these barriers is telepractice—a method of connecting families and practitioners using synchronous, two-way audiovisual technologies. This study compared the self-assessed use of family-centered practices by a group of practitioners delivering FCEI through telepractice with that of a similar group delivering FCEI in-person. A sample of 38 practitioners (15 telepractice and 23 in-person) from two early intervention programs for children who are DHH completed a self-assessment tool: the Measures of Processes of Care for Service Providers. Results indicated that there were no significant differences between telepractice and in-person sessions with regard to practitioners' self-assessment of their use of family-centered practices.

Family-centered early intervention (FCEI) has been promoted as best practice in early childhood early intervention for children with disabilities for more than three decades, and is a widely accepted approach for supporting young children who are deaf or hard of hearing (DHH) (Allen & Petr, 1996; Dunst & Espe-Sherwindt, 2016; Epley, Summers, & Turnbull, 2010; Joint Committee on Infant Hearing, 2007, 2013, 2019). Globally, there has been an increasing recognition and acceptance of the United Nations (UN) Convention on the Rights of the Child (1989) and Convention on the Rights of Persons with Disabilities (2006), both of which endorse the provision of supports and services that promote FCEI (S. Brown & Guralnick, 2012). For children who are DHH, the provision of FCEI has been recommended as best practice by the Joint Committee on Infant Hearing (2007, 2013, 2019), and reinforced by an international consensus statement produced by early intervention professionals, parents, and researchers (Moeller et al., 2013).

The goal of early childhood intervention is to provide services that support the child's overall development—including communication and language development—and enable meaningful participation within their family and community (Division for Early Childhood, 2014; Moeller et al., 2013). An FCEI approach focuses on the active involvement of families in all aspects of the early intervention process including decisionmaking, planning, and implementing early intervention sessions (Dunst & Espe-Sherwindt, 2016; Dunst, Trivette, & Hamby, 2007;

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Epley et al., 2010). It also uses the context of daily routines and activities to nurture family strengths, build family capacity, and promote family-practitioner partnerships (Division for Early Childhood, 2014; Dunst & Espe-Sherwindt, 2016; Moeller et al., 2013). Multiple studies have shown that practitioners' use of family-centered practices is associated with caregivers' competence and confidence in supporting their child's language and communication development, which, in turn, are associated with positive outcomes for children with disabilities, including those who are DHH (Dunst, Hamby, & Raab, 2019; Harrison et al., 2016; Moeller et al., 2013).

The most common model for delivering FCEI has been "inperson" where the family and practitioner meet in the same physical location. Such services are provided within a range of environments, including the home, community settings, and early intervention centers. However, a number of known barriers can hinder families' access to FCEI services, including a lack of appropriate services, geographical inaccessibility of services, and a shortage of qualified practitioners (Arefadib & Moore, 2017; Barr, Duncan, & Dally, 2018; McCarthy, Leigh, & Arthur-Kelly, 2019). Barriers to access are particularly pronounced for children with low-incidence disabilities, such as hearing loss (Joint Committee on Infant Hearing, 2007, 2013, 2019).

A strategy that is being used increasingly to overcome barriers to access to FCEI is telepractice-the use of videoconferencing technology to provide simultaneous, real-time audio and video streams to the family and the practitioner, irrespective of their physical locations. Recently, a number of studies have demonstrated that telepractice offers the opportunity to improve access to early intervention practitioners, and can successfully build caregivers' skills in supporting their child's development (Ashburner et al., 2016; McDuffie et al., 2016; Meadan et al., 2016; Vismara et al., 2016). However, there has been relatively little consideration in the research literature of the use of telepractice to deliver FCEI specifically to children who are DHH. The study reported in this paper investigated whether selfreported use of family-centered practices differed between inperson and telepractice settings for practitioners working with children who are DHH.

Barriers to Accessing FCEI In-Person

Early childhood early intervention for children who are DHH is a highly specialized field that requires practitioners to acquire a unique skill set. Such services can be provided by professionals from a wide range of backgrounds, including early childhood educators, special educators, teachers of the deaf, and speechlanguage pathologists. Each of these disciplines varies in the extent to which preservice training provides input on the FCEI philosophy and associated approaches to intervention and not all of these professional groups will enter the professional workforce with sufficient knowledge or skills to be competent in the delivery of FCEI (Bruder et al., 2013; Campbell et al., 2009; Smith, 2010). Most will require additonal specialist professional preparation and, consequently, the number of practitioners who are specifically trained to deliver FCEI to families of young children who are DHH is low (Joint Committee on Infant Hearing, 2013). Even when trained and engaged in service delivery, this group of professionals will likely face the additional challenges of dealing with diverse caseloads, and having fewer opportunities for professional development and collegial support-particularly in areas where there is a low incidence of hearing loss (Arefadib & Moore, 2017; Rude & Miller, 2018). All professionals benefit from opportunities to observe experienced colleagues and to practice specific evidence-based strategies in multiple environments (Dunst, 2015; Dunst & Raab, 2010). Indeed, research suggests that proficiency in using family-centered practices is not directly related to practitioners' overall years of experience, but, rather, may result from practitioners' specific experience in observing and using discrete family-centered practices (A. S. Brown, 2015; Sawyer & Campbell, 2012). In the case of FCEI professionals working with DHH children, the lack of opportunities for supervised practice or mentoring by peers limits professional growth and contributes to high levels of staff turnover and workforce shortages, particularly in rural areas (Arefadib & Moore, 2017; McCarthy, Duncan, & Leigh, 2012).

In addition to workforce shortages, the combination of demography and geography presents a number of challenges. The high cost of establishing local services for a relatively small number of children may not be justifiable and there are similarly unsustainable travel and associated costs related to the provision of outreach services to children in widely dispersed locations (Arefadib & Moore, 2017; Barr et al., 2018; McCarthy et al., 2012). This is especially true in areas where practitioners are required to cover large distances, navigate difficult terrain, and contend with extreme weather conditions (McCarthy et al., 2012). In a study conducted by Lai, Serraglio, and Martin (2014), DHH children who lived closer to an early intervention center received more timely access to appropriate services, suggesting that geographical distance does indeed pose a barrier to accessing early intervention services.

Telepractice and FCEI

In an effort to combat these barriers to access, telepractice is being used to provide early childhood early intervention services to children who are DHH and their families. The use of telepractice provides a way for children with low-incidence disabilities, such as hearing loss, to benefit from greater access to services in their homes, or closer to their homes, and at times that may fall outside of typical working hours (Behl et al., 2017; A. S. Brown, 2015; McCarthy et al., 2012). Despite the potential benefits of using telepractice to deliver early childhood early intervention services, there are questions regarding the extent to which practitioners apply-or can apply-the principles of FCEI in this mode of delivery. First, it seems that some practitioners may be reluctant to adopt telepractice, citing a personal preference for in-person services, difficulties establishing therapeutic relationships with clients, and concerns that caregivers' level of therapeutic and technical skills may restrict their ability to participate in telepractice (Blaiser et al., 2013; Cole, Pickard, & Stredler-Brown, 2019; Freckman, Hines, & Lincoln, 2017; Havenga et al., 2017; Hines et al., 2015). These reservations suggest a focus on practitioner-led intervention strategiesincluding teaching the child directly, using practitionerprovided materials, and relying on practitioner-determined activities-rather than the use of family-centered practicesincluding coaching the caregiver, using everyday routines, and emphasizing collaborative practices (Dunst et al., 2007; Salisbury & Cushing, 2013). Second, there are issues that pertain to practitioners' use of FCEI practices, regardless of the modality in which they are operating (i.e., in-person or via telepractice). Specifically, it is evident that, even with the weight of available evidence to support the use of family-centered practices, many practitioners do not consistently apply these practices in their early intervention sessions (Basu, Salisbury, & Thorkildsen, 2010;

Fleming, Sawyer, & Campbell, 2011; Ingber & Dromi, 2010; Salisbury, Cambray-Engstrom, & Woods, 2012). The reasons for lack of application of these principles are unclear, but may include the intervention approaches associated with professional disciplines, content and format of practitioner training, breadth of experience, and the nature of the early intervention setting in which the practitioners are operating (Campbell & Coletti, 2013; Dunst, Bruder, & Espe-Sherwindt, 2014; Fleming et al., 2011).

In the field of deafness, first generation research on telepractice has focused on the reliability of technology, using checklists and satisfaction surveys to explore the feasibility and practicality of using that technology as a tool for service delivery (McCarthy et al., 2019). These studies have generally supported the use of telepractice but have not addressed the issues identified above with regard to the implementation of family-centered practices. Second generation studies on telepractice have shifted the research focus beyond technology reliability and participant satisfaction to examine the quality and effectiveness of intervention including practitioners' use of family-centered practices, caregiver engagement, and specific child/family outcomes (Behl et al., 2017; Blaiser et al., 2013; A. S. Brown, 2015; Havenga et al., 2017). Although the results are promising, these studies share several limitations including small sample sizes, varied levels of technical support, differing degrees of telepractice training, and limited practitioner experience delivering services through telepractice (McCarthy et al., 2019).

The Present Study

This study forms part of a series of studies comparing FCEI in telepractice and in-person settings through (a) the reported self-efficacy and involvement of caregivers (McCarthy, Leigh, & Arthur-Kelly, 2020a), (b) the self-assessment of use of FCEI practices by practitioners (this study), and (c) analysis of the actual behaviors of pairs of caregivers and practitioners (McCarthy, Leigh, & Arthur-Kelly, 2020b). The present study sought to determine whether there was any difference between the self-assessed use of family-centered practices by practitioners working in two distinct early intervention delivery modes: telepractice and in-person. Specifically, the following research question was posed:

 Do practitioners report different levels of use of familycentered practices when early childhood early intervention is delivered through telepractice versus in-person?

As already noted, a number of other characteristics of practitioners have been identified in the literature as potential influences on their use of family-centered practices, regardless of setting. To account for the potential effect of those characteristics, the following additional question was posed:

2. Are there any subgroup differences in practitioners' assessment of their use of family-centered practices that can be accounted for by (a) their professional discipline, (b) the length of their experience in early intervention, and/or (c) their additional professional qualifications?

Methods

This study comprised a two-group comparison design using convenience samples of practitioners drawn from a single large organization that operated two discretely administered early intervention programs for children who are DHH: one in-person and one through telepractice. One group of practitioners was employed to deliver early intervention services in-person and the other group to deliver early intervention services through telepractice. The variable of interest was the practitioners' selfassessed use of family-centered practices. Subsequent partitioning of the two groups allowed for the examination of the effects of the three potentially influential practitioner characteristics: (a) professional discipline, (b) length of experience, and (c) additional qualifications. Ethical approval for this study, and the larger project, was gained from the Human Research Ethics Committee at the University of Newcastle (Australia).

Study Context

To address several of the limitations identified in previous studies (Behl et al., 2017; Blaiser et al., 2013; A. S. Brown, 2015; Havenga et al., 2017), the present study was conducted within one organization that operated two discretely administered early intervention programs that employed two distinct groups of practitioners who were supervised by two separate managers. This approach facilitated access to a large sample of practitioners and mitigated the possible effects of differing program philosophies and service delivery patterns (e.g., frequency and duration of sessions) between groups; because both programs adhered to a single set of organization-wide service provision principles that documented the organization's commitment to a family-centered philosophy in the delivery of early intervention services. Interviews with the managers of both programs verified their respective commitment to the organizational philosophy of FCEI, and confirmed that early intervention sessions delivered through telepractice or in-person followed a similar service delivery pattern. In accordance with organizational policy, all sessions included a child and caregiver, and, typically, were provided for one hour each week (approximately 40 sessions per year). Both managers also confirmed the provision of ongoing professional development opportunities related to familycentered practices for their respective staff members. At least twice per month, each team participated in specific training related to the use of discrete family-centered practices such as using home routines, facilitating parent-child interactions, and coaching parents.

All practitioners in the telepractice program received specific training and mentoring in telepractice according to a defined protocol, which included modules on pedagogy, methodology, and technology (McCarthy, 2013). Telepractice sessions were delivered through high-speed internet connections and utilized interactive videoconferencing technology to provide all participants with access to synchronous, real-time audio and video signals. Families received initial support to set up technology in the home and participated in a practice session to ensure familiarity with the technology and adequate internet connectivity for ongoing telepractice sessions. During telepractice sessions, practitioners had access to dedicated onsite support to minimize technical disruptions and maintain stable videoconferencing connections.

Participants

As noted earlier, this study formed part of a larger project involving both caregivers and practitioners. The participants in the study reported here were exclusively practitioners. All 52 practitioners who were employed as early intervention providers in the two nominated programs were invited to participate. Eligible participants were defined as being the primary provider of a regular early intervention service to families of children who were: (a) DHH, (b) under the age of eight years (i.e., consistent with the definition of early childhood by the Division for Early Childhood of the Council for Exceptional Children (2020)), and (c) had been enrolled in the two early intervention programs (i.e., either telepractice or in-person) for longer than two months. Practitioners who provided ancillary services, such as annual assessment or short-term psychological support, were not included in this study. No other exclusion criteria were applied. According to these criteria, the telepractice program employed 17 eligible participants who provided services to 112 children, whereas the in-person program employed 35 staff for 239 children. Demographic details for the children and families associated with these practitioners and programs are provided in a related paper (McCarthy et al., 2020a).

Instruments

An electronic survey comprising two parts was delivered via an on-line platform (surveygizmo.com), which was used to (a) distribute invitations, (b) provide access to the questionnaire, and (c) collate responses. In total, the survey included 33 questions. The first part comprised six researcher-developed demographic questions. The remaining 27 questions comprised the Measure of Processes of Care for Service Providers (MPOC-SP) in an electronic format authorized by the publisher.

Part 1—demographics The first part of the survey sought information about practitioners' qualifications, experience, and caseloads. Questions were presented in a multiple choice or short answer format. The questions were consistent with information commonly collected in other studies investigating the use of FCEI with families of children who are DHH (Behl et al., 2017; Blaiser et al., 2013; A. S. Brown, 2015). The final set of demographic questions is included in the Appendix.

Part 2—MPOC-SP The second part of the survey was an electronic version of an existing questionnaire—the Measure of Processes of Care for Service Providers (MPOC-SP) (Woodside et al., 1998). No changes or additions were made to the instrument in accordance with publisher requirements. The MPOC-SP consists of 27 questions that ask practitioners to indicate on a 7-point Likert scale "to what extent" they utilized specific family-centered practices over the previous twelve months. Overall scores are derived by summation of individual responses to a continuous scale ranging from 1–7, where 1 is defined as "not at all" and 7 is "to a very great extent". Allowable responses also included a "not applicable" option of 0 with those items being excluded from the scoring, Table 1 shows the scoring scale.

Responses to the MPOC-SP allow for the calculation of subscale scores in four domains: Providing General Information, Communicating Specific Information, Showing Interpersonal Sensitivity, and Treating People Respectfully. The first domain, Providing General Information, contains five items related to the provision of general information that builds family capacity to support their child within the home and the community. The second domain, Communicating Specific Information, consists of three items related to the provision of information specific to the child's individual needs, services, and progress. The third domain, Showing Interpersonal Sensitivity, comprises 10 items that address practitioners' use of participatory help-giving behaviors that support and enable families, such as building

Table 1 MPOC-SP scoring scale

Numerical score	Categorical label
0	Not Applicable
1	Not at all
2	To a very small extent
3	To a small extent
4	To a moderate extent
5	To a fairly great extent
6	To a great extent
7	To a very great extent

MPOC-SP = Measure of Processes of Care for Service Providers.

on families' strengths, and helping parents to feel competent in their roles as parents. The final domain, Treating People Respectfully, contains nine items that describe practitioners' use of relational help-giving practices such as treating parents as equals and valuing caregivers' input.

The MPOC-SP was selected for this study for a number of reasons. First, the MPOC-SP evaluates practitioners' use of specific family-centered practices that have been established in the research literature as contributing to positive child and family outcomes for children with disabilities, including those who are DHH (Dunst et al., 2019; Harrison et al., 2016; Moeller et al., 2013). Specifically, for children who are DHH, the MPOC-SP addresses practitioners' use of practices that enhance caregiverchild interactions which are associated with improved language and communication outcomes for children who are DHH (Dunst et al., 2019; Harrison et al., 2016; JCIH, 2019; Moeller et al., 2013). Second, the instrument has been well-documented as a reliable and valid measure of the extent to which practitioners provide family-centered services (Cunningham & Rosenbaum, 2014; Woodside et al., 2001). The original validation study reported good internal consistency for all four scales with Cronbach's alphas ranging from .76 to .88 (Woodside et al., 2001). Third, the MPOC-SP has been used in studies in more than 11 different countries and, since its creation, has been reliably translated from English into 14 other languages, demonstrating its usefulness in evaluating family-centered services (Cunningham & Rosenbaum, 2014; Dickens, Matthews, & Thompson, 2011; Dyke et al., 2006; Raghavendra et al., 2007). Finally, the MPOC-SP has been used to measure the use of family-centered behaviors by a range of professional groups (Cunningham & Rosenbaum, 2014) including speech-language pathologists (Dickens et al., 2011; Dyke et al., 2006; Raghavendra et al., 2007; Woodside et al., 2001) and educators (Jeglinsky, Autti-Rämö, & Brogren Carlberg, 2012; Nijhuis et al., 2007; Tang et al., 2012), both of which were involved in the present study.

Sampling Procedures

The on-line survey platform (surveygizmo.com) was used to distribute an electronic invitation to all eligible participants across both programs. Flyers were also posted within the organization to ensure that all potential participants were aware of the study. After two weeks, a reminder email was sent, and paper copies were provided if requested. Researchers also contacted potential participants by telephone or in-person to ensure receipt of the invitation and to answer any questions about participation. All of these steps were taken to ensure equity of access for part-time staff and those with limited computer access and were consistent with ethical approval.

Characteristic	Telepractice $(n = 15)$	In-person ($n = 23$)	Totals (N = 38)
Professional type			
Teacher	12	15	27
Therapist	3	8	11
Additional qualification			
Entry-level qualification	3	4	7
Additional specialist	12	19	31
qualification			
Years of experience			
<5 years	6	5	11
>5 vears	9	18	27

In total, 38 of 52 eligible practitioners completed the survey representing a 73% response rate. The purpose of this study was to investigate the impact of service delivery mode (i.e., telepractice or in-person) on practitioners' assessment of their use of family-centered practices. Accordingly, service delivery mode was defined by each program's stated approach (i.e., telepractice or in-person) and participants were assigned to either the telepractice or in-person groups according to the program in which they had delivered services for the previous twelve months. To ensure that group assignments were accurate, participants were specifically asked whether they used telepractice and, if so, to indicate the percentage of their caseload receiving services in that mode. Participants' responses confirmed that all predicted group assignments were correct with the possible exception of three respondents from the in-person group. These participants each reported using telepractice on at least one occasion during the previous 12 months to supplement their usual in-person sessions. These practitioners had not participated in the same training and mentoring as practitioners in the telepractice group, and, because the overwhelming majority of their service delivery took place in-person, all three were assigned to the in-person group. According to these criteria, the groups consisted of 23 practitioners providing services in-person and 15 practitioners providing services through telepractice. Response rates were 66% for the in-person group and 88% for the telepractice group.

Based on their responses to the survey, participants were categorized with regard to each of the practitioner characteristics identified in the literature as potential predictors of use of family-centered practices: professional discipline, years of experience, and additional qualifications. Detailed descriptive information for practitioners is provided in Table 2. Overall, the majority of practitioners were teachers with additional qualifications who had more than five years' experience delivering FCEI to children who are DHH.

Professional discipline was determined by self-report from six possible options (a) speech-language pathologist, (b) teacher of the deaf, (c) early childhood teacher, (d) special education teacher, (e) audiologist, and (f) other. No participants identified as "audiologist" or "other". The remaining groups were collapsed into two categories—teachers and speech-language pathologists. The teacher group included teachers of the deaf, early childhood teachers, and special education teachers. All of the remaining participants identified as speech-language pathologists.

The focus of this study was on the influence of service delivery mode: therefore "experience" was defined as the number of years that practitioners had been working in their current mode of delivery (i.e., in-person or telepractice). Practitioners were grouped into those with fewer than five years of experience and those with more than five years of experience. The mean number of years worked in the current role was 8.3 years (standard deviation = 5.7) with a range from 1 to 25 years. For the majority of participants, years of experience in the particular mode of service delivery (i.e., telepractice or in-person) was also a proxy for overall experience in early intervention. This was not the case for three practitioners who reported more than 5 years of overall experience delivering FCEI but fewer than 5 years in their current role. This included one practitioner delivering in-person services and two using telepractice. These three participants were categorized according to years of experience in their current role to maintain the focus on the primary research question relating to mode of service delivery.

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Regardless of professional discipline, all participants possessed the required entry-level qualifications for employment in the role of early interventionist, but many possessed additional, specialist qualifications. Consequently, participants were divided further into two groups according to additional qualifications: those who had completed additional, specialist qualifications related to deafness (e.g., Language Specialist Certified Auditory-Verbal Therapist) and those who had not.

Analysis

All survey responses were collated for analysis using IBM SPSS Statistics for Windows, Version 24.0. Chi-square tests were used to evaluate the similarity of the two primary groups (i.e., telepractice and in-person) with regard to identified practitioner characteristics. Scores for each of the four MPOC-SP domains were calculated using the scoring rules defined by Woodside et al. (1998). Items scored as 0 or "not applicable" were considered missing and not included in scoring. Valid responses were required for at least 75% of the domain items in order for a subscale score to be calculated. Shapiro–Wilk tests of normality were conducted to evaluate the distribution of the mean scores for each scale. Cronbach's alpha was used to calculate the internal consistency coefficient for each of the four scales.

Multivariate analysis of variance (MANOVA) was used to determine whether the reported use of specific family-centered practices varied as a function of intervention mode. Follow-up tests using univariate ANOVAs were carried out and used to estimate effect sizes for the four MPOC-SP domains. To account for potential subgroup differences, a further series of multivariate analyses was completed for each of the three identified participant characteristics (i.e., professional discipline, further



Figure 1 Means and standard deviations of MPOC-SP subscale scores for telepractice (n=15) and in-person (n=23) groups.

Table 3 Cronbach's alpha for each subscale of the MPOC-SP for the original validation study" and the present study

Variable	Validation Study (N=29)	Present study (N=38)
	α	ai
Subscale 1 (SIS)	.86	.86
Subscale 2 (PGI)	.88	.87
Subscale 3 (CSI)	.76	.70
Subscale 4 (TPR)	.84	.80

^a(Woodside et al., 2001).

CSI = Communicating Specific Information; MPOC-SP = Measure of Processes of Care for Service Providers; PGI = Providing General Information; SIS = Showing Interpersonal Sensitivity; TPR = Treating People Respectfully.

education, and years of experience) to determine whether there was any relationship between these attributes and service delivery mode followed by univariate t-tests. An alpha level of .05 was used for all analyses and effect sizes were calculated using Cohen's *d*.

Results

This study examined the influence of service delivery mode telepractice or in-person—on practitioners' reported use of family-centered practices defined as the four subscale scores on the MPOC-SP, (a) Showing Interpersonal Sensitivity (SIS), (b) Providing General Information (PGI), (c) Communicating Specific Information (CSI), and (d) Treating People Respectfully (TPR). Figure 1 shows a graph of the mean scores and standard deviations for each subscale of the MPOC-SP for the two groups: telepractice and in-person.

Using the Shapiro-Wilk test of normality, three of the four subscales were found to be normally distributed whereas the fourth subscale (Communicating Specific Information) was not normally distributed (p = .004). On this subscale, two respondents had extremely low scores (i.e., 2.00 and 2.70) whereas the remainder of the participants scored between 4.00 and 7.00. Notably, these two respondents were both experienced practitioners, but represented different modes of service delivery and were from different professional disciplines. Tests of internal consistency indicated good reliability (i.e., Cronbach's $\alpha > .70$) for each of the four scales and were consistent with levels reported in the original validation study. Reliability data are reported in Table 3. Chi-square analysis of group differences revealed that there were no statistical differences between the two groups (i.e., telepractice and in-person) in regard to the highest qualification (p = 1.00), professional group (p = .48), or experience (p = .12).

MANOVA analysis showed that delivery mode had no significant effect overall on subscale scores (Wilk's lambda .94, F(4, 33)=.48, p=.75). Individual analysis of variance (ANOVA) tests showed no significant differences between the telepractice and in-person groups for any of the four MPOC-SP subscales (F(1, 36)=1.03, .00, .02, .36, respectively, p=.32, .99, .89, .55, respectively) Table 4 provides the summary statistics, effect sizes, and confidence intervals for the difference between the MPOC-SP subscale scores for practitioners in the two modes.

In addition to the primary research question, the influence of each of the three practitioner characteristics that have been identified in the research literature as potentially affecting practitioners' use of family-centered practices was also considered. As noted, these characteristics were (a) professional discipline, (b) years of experience, and (c) level of professional qualification. Multivariate analyses were completed to determine whether there was any relationship between these characteristics and service delivery mode in regard to use of family-centered practices. No significant relationships were found.

Further analyses were undertaken to determine any relationships between practitioner characteristics and use of familycentered practices. Univariate tests were applied to identify any effects of practitioner characteristics on scores for the subscales, across the entire sample. Professional group was significant for the TPR subscale (p=.019) and years of experience was significant for the PGI subscale (p=.032). There were no significant findings related to specialist qualifications. For the two areas where the univariate analysis showed significance, independent samples t-tests were conducted to examine the finding in more detail. Table 5 shows the MPOC-SP mean scores and standard

Table 4 Summary statistics, effect sizes as Cohen's d and 95% CIs for the difference between the two approaches

	Telepractice	In-person	Mean Diff (T-I)	95% CI			
Variable	M (SD)	M (SD)		LL	UL	Cohen's d	
Subscale 1 (SIS)	5.34 (0.93)	5.61 (0.72)	-0.27	-0.82	0.27	-0.33	
Subscale 2 (PGI)	4.55 (0.99)	4.56 (1.45)	-0.003	-0.87	0.87	-0.01	
Subscale 3 (CSI)	5.53 (1.28)	5.59 (1.06)	-0.05	-0.83	0.72	-0.05	
Subscale 4 (TPR)	5.96 (0.58)	6.08 (0.57)	-0.11	-0.50	0.27	-0.21	

Note: N = 38 (telepractice n = 15; in-person n = 2 3), Cohen's d using pooled SD weighted by sample size. CI = confidence interval; CSI = Communicating Specific Information; LL = lower limit; PGI = Providing General Information; SIS = Showing Interpersonal Sensitivity; SD = standard deviation; TPR = Treating People Respectfully; UL = upper limit.

MPOG-SP subscale	Practitioner Characteristic	n	M (SD)	d
Subscale 2 (PGI)	Years of experience	0.77		
	<5 years	11	3.85 (1.50)	
	>5 years	27	4.84 (1.07)	
Subscale 4 (TPR)	Professional discipline	0.49		
	Teacher	27	6.17 (0.51)	
	Therapist	11	5.69 (.59)	

Note. Cohen's d using pooled SD weighted by sample size. MPOC-SP = Measure of Processes of Care for Service Providers; PGI = Providing General Information; SD = standard deviation; TPR = Treating People Respectfully.

deviations for each significant relationship. In the case of the TPR subscale, teachers reported significantly higher levels of family-centered practices than therapists. In the case of the PGI subscale, the mean score of practitioners with more than 5 years' experience was significantly higher than practitioners with less than 5 years' experience. Effect size was calculated for both findings using Cohen's d. There was a medium effect size for professional group (d = 0.49) and a large effect size for experience (d=0.77).

Discussion

This study was designed to investigate whether there were differences between practitioners' assessment of their application of family-centered practices when early intervention is delivered through telepractice versus in-person. Practitioners delivering services through telepractice reported the use of familycentered practices to a similar extent to those delivering services in-person. Analysis of participants' MPOC-SP subscale scores indicated that there were no significant relationships between practitioners' assessment of their use of specific family-centered practices and delivery mode. These results remained consistent even when practitioner characteristics such as professional discipline, specialist qualifications and practitioner experience were considered. Although further research is required to confirm the relationship between reported and actual practices, this study provides encouraging support for the view that there is no difference between early intervention services delivered inperson and through telepractice in terms of practitioners' use of family-centered practices.

The findings presented here contribute to the growing evidence base surrounding the use of telepractice to deliver FCEI to children who are DHH. In this study, practitioners' selfassessment of their use of family-centered practices did not differ significantly between telepractice and in-person delivery (see Table 4 for mean differences and 95% confidence intervals). In addition, the present study addressed many of the limitations reported in similar studies in regard to sample size, technical support, and the amount of practitioner training and experience with telepractice. Specifically, this study was designed to minimize the potential for variability within or between groups by using a convenience sample within one organization. This design feature limited potential group differences in regard to the variables noted above as well as variables related to program philosophy, service delivery patterns, and reliability and stability of technology. Finally, the present study included a larger sample of practitioners (N=38) than previous studies (Behl et al., 2017 [N=15]; Blaiser et al., 2013 [N=9]; A. S. Brown, 2015 [N=16]; Havenga et al., 2017 [N = 1]).

Although not the primary focus of this study, there were some interesting findings in regard to the relationship between reported family-centered practices and specific practitioner characteristics, regardless of mode of delivery. When considering all practitioners in this study, two characteristics were found to be individually significant for a specific subscale. The professional background of practitioners (i.e., whether they were teachers or speech-language pathologists) was significant for the TPR subscale while years of experience was significant for the PGI subscale. The first finding indicates that teachers reported practices related to treating people respectfully to a greater extent than did the cohort of therapists participating in this study. The second finding indicates that practitioners with more experience tended to provide more general information to families than those with less experience.

The first finding, relating to professional discipline, might reflect the diversity of preservice training programs undertaken by early intervention providers (Bruder et al., 2013; Campbell & Coletti, 2013; Joint Committee on Infant Hearing, 2013; Smith, 2010). The TPR scale includes items related to respecting parents as equals, valuing their input, viewing parents as experts on their child, and supporting parents to partner in their child's care. Perhaps teacher training programs focus more explicitly on understanding and implementing practices that support family involvement whereas therapist training programs emphasize a more traditional, practitioner-led approach. Although beyond the scope of this study, future research to investigate the differences between existing preparation programs for various disciplines may yield useful information on how to refine and improve training.

The second finding, relating to years of experience, is consistent with results from other studies using the MPOC-SP (Dyke et al., 2006; Jeglinsky et al., 2012). The PGI scale relates to supports for the broader family context, such as family-to-family connections, and information about counseling services, community resources, or financial assistance. This finding might reflect the fact that more experienced practitioners have worked with a greater number of families with a range of individual needs. These experiences might provide practitioners with access to a collection of general information resources that less experienced practitioners may not have accumulated yet. More experienced practitioners may have gained a wider breadth of knowledge over time and be better able to provide general information whereas less experienced practitioners may focus more on the disability-specific information derived from their initial training. As suggested by Jeglinsky et al. (2012), professional assurance also may be a factor. Practitioners tend to develop greater self-confidence in their role over time because of their acquired knowledge and experience, and, consequently, more experienced practitioners may have a greater awareness of the

importance of general information in supporting families and building family capacity.

Implications

The results reported here suggest a number of implications that are highly relevant for practice in the support of young children who are DHH and their families. This study indicates that, on average, in terms of the MPOC-SP, practitioners providing services through telepractice reported their use of family-centered practices "to a fairly great extent". Furthermore, practitioners in this study reported similar levels of use of a range of familycentered behaviors, regardless of whether early intervention services were delivered in person or through telepractice. These results suggest that telepractice could provide an acceptable alternative to in-person delivery of early childhood intervention services in a range of situations where there are barriers to the delivery of in-person services, without compromising the practices of FCEI.

It is noteworthy that, when considered individually, specific practitioner characteristics had significant effects. Practitioners' assessment of their use of certain types of family-centered practices was influenced by their professional background and years of experience. In this study, across the entire sample, teachers were more likely than therapists to report the use of behaviors that encouraged family involvement. This is important because previous studies have shown that higher quality early intervention sessions are associated with greater parental involvement than lower quality sessions (Aikens et al., 2015; Behl et al., 2017; Roggman et al., 2016). Also, experienced practitioners in this study were more likely to provide general information than their less experienced counterparts. This is noteworthy because the provision of general information is an important strategy for building family capacity and supports families' wellbeing by empowering families to make informed decisions about their child's development and obtain necessary resources and advice (Dunst et al., 2007; Dyke et al., 2006; Jeglinsky et al., 2012). These findings suggest that specific subgroups of practitioners (namely, therapists and less experienced practitioners) might benefit from targeted professional development opportunities with regard to FCEI. A useful strategy into the future of this field may be the provision of specific training in relation to these particular family-centered practices using a model such as that outlined by Dunst (2015) including mentoring and supervised practice.

Limitations and Future Research Directions

The results of this study derive from self-assessment, rather than observed phenomena. As already noted, the relationship between reported and actual practice in this context remains to be confirmed. It is also noted that the self-report assessment instrument used here (i.e., the MPOC-SP) was designed to measure the extent of usage of FCEI practices and does not address the reasons why practitioners may or may not choose to use specific practices. Further, it is recognized that, given the collection of data was within one organization, practitioners in these identifiable groups might have deliberately indicated more frequent use of socially or organizationally desirable practices; although any such over-reporting effect would likely have applied to practitioners in both modes of delivery. To address these issues, future researchers might consider a number of possible strategies, including (a) the collection of observational data to substantiate self-report findings, (b) expanding on the results of this research through structured interviews with participants to identify reasons for their use—or nonuse—of particular FCEI practices, and (c) sampling across different programs to increase sample sizes and decrease the identifiability of data sources as a basis for reducing any social desirability effect in participant responses.

This study specifically investigated practitioners' selfassessment of their use of family-centered practices. Practitioners' perspectives are valuable, but address only one component of FCEI, namely the delivery of services. The views of service recipients are equally important and a separate study in this series explored families' perceptions of family-centeredness through a self-report instrument addressing caregiver selfefficacy and involvement (McCarthy et al., 2020a). Also, the behaviors measured by the MPOC-SP focus on the broad, foundational principles of family-centeredness recommended for use by all early intervention practitioners, and are not unique to practitioners supporting families of children who are DHH. Family-centered practices are known to support children's communication and language development, but they are not specific to the needs of families with children who are DHH. Future research might examine practitioners' use of specific strategies related to the communication development of children who are DHH.

Given the uneven number of participants in the subgroups (e.g., professional group: therapists n=11, teachers n=27), the main effect findings presented for the secondary research question could represent Type I errors. Nevertheless, a discernible difference was observed in ANOVA results, and the associated p-values and effect sizes suggest a true effect. In order to test the findings from the present study it would be valuable to replicate the design with a larger cohort, thereby achieving greater statistical power.

The present study deliberately used an intact sample within one organization, in an effort to maximize the number of participants while controlling for several potentially intervening variables such as potential differences in program philosophy, service delivery patterns, and opportunities for professional learning as well as variations in the stability of telepractice technology, the level of available technical support, and the amount of training provided in the particular service delivery mode. Although an intact sampling approach may have introduced other variables, it mitigated the variables that have been noted as limitations in other studies. This approach reduced the potential influence of these variables and resulted in a high response rate. Future studies might consider sampling across different programs to investigate variables related to organizational bias and identifiable data, as well as other potentially intervening variables.

The practitioners in this study comprised a group of highly experienced and highly educated practitioners with additional qualifications and access to regular professional development in family-centered practices. It is possible that this group is uniquely qualified to deliver family-centered services and may not be representative of the general population of practitioners working with families of children who are DHH. In addition, the telepractice group received specific training and mentoring that may have prepared them to deliver telepractice sessions with a higher degree of family-centeredness than other telepractitioners. Future studies might consider investigating the impact of additional training and professional development on practitioners' use of discrete family-centered practices and whether specific telepractice training enhances the familycenteredness of sessions delivered in that mode.

Conclusion

Overall, this study sought to investigate the significance of service delivery mode on practitioners' self-assessment of their use of family-centered practices with children who are DHH, while also considering the potential influence of other identified practitioner characteristics. Results suggest that individual characteristics such as professional discipline or years of experience may have more significant influence on practitioners' use of certain family-centered practices than delivery mode. Indeed, this study found no significant differences between practitioners' reported use of family-centered practices in a telepractice model versus an in-person model even when practitioner characteristics such as professional discipline, specialist qualifications and practitioner experience were considered. This finding provides support for the view that FCEI can be delivered through telepractice in a manner that is comparable to services delivered in-person.

Conflicts of Interest

No conflicts of interest were reported.

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Appendix

Demographic questions

- 1. Which department do you work in?
- 2. Do you currently use telepractice with any families on your caseload?
 - a. If yes, what percentage of families on your caseload uses telepractice?
- 3. Which of the following professional categories best describes you?
- 4. Please list all qualifications relevant to your current role.
- 5. How long have you been working in your current role?
- 6. Prior to your current role, how many years of experience did you have providing family-centered early intervention to children who are DHH?

3.3 Chapter summary and conclusion

Practitioners' use of family-centred practices is a key component of FCEI that enhances caregivers' competence and confidence in supporting their child's early development. The article presented in this chapter highlighted a gap in the literature regarding the use of family-centred practices in a telepractice setting for children who are DHH. The study examined the effect of delivery mode (i.e., telepractice or inperson) on practitioners' self-assessed use of family-centred practices in early intervention for children who are DHH, and their families. In response to Research Question 2—Do practitioners report different patterns of use of family-centered practices when early childhood early intervention is delivered through telepractice versus in-person?—this study found no significant differences between practitioners' use of family-centred practices when FCEI was provided in-person or through telepractice. Practitioners in both groups (i.e., telepractice and in-person) reported similar levels of use of family-centred practices.

These findings support the proposition that practitioners providing FCEI through telepractice can maintain the use of family-centred practices at a level consistent with in-person services. The findings are significant, but relate to only one half of the practitioner-caregiver partnership, namely the practitioners' perspective. Chapter 4 addresses the other half of the partnership by examining whether caregivers' reported levels of self-efficacy and involvement in their children's early development differ when FCEI is delivered through telepractice rather than in-person.

CHAPTER 4: CAREGIVERS' SELF-EFFICACY AND INVOLVEMENT

4.1 Introduction

Self-efficacy and involvement are known to be critical components in ensuring caregivers' ability to support the development of their young children who are DHH (Ambrose, Appenzeller, Mai, & DesJardin, 2020; Luterman, Kurtzer-White, & Seewald, 1999; Punch & Hyde, 2010). Existing research evidence is presented here that demonstrates the significant relationships between the developmental outcomes for children who are DHH and caregivers' confidence, competence, and engagement in FCEI. To date, most of the evidence has related to families receiving FCEI in-person, with little evidence to corroborate these findings for families who access FCEI through telepractice. Article 3, which is included in this chapter, examines the self-efficacy and involvement of caregivers receiving FCEI through telepractice.

4.2 Article 3: Comparison of caregiver engagement in telepractice and in-person family-centered early intervention

The third article presented in this thesis describes a comparative study designed to addresses Research Question 3: *Do caregivers' reported levels of self-efficacy and involvement differ when early intervention is delivered through telepractice versus inperson?* The study investigated caregivers' assessment of their own self-efficacy and involvement in FCEI for their children who are DHH. In this study, two groups of caregivers—one in telepractice and the other in-person—completed an existing rating scale, The Scale of Parental Involvement and Self-Efficacy (DesJardin, 2005). Study design, methods, results, and discussion are reported. Article 3 included in this chapter is the final version of the article published in The Journal of Deaf Studies and Deaf Education, reproduced by permission of Oxford University Press.

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Comparison of Caregiver Engagement in Telepractice and In-person Family-Centered Early Intervention

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Abstract

Telepractice—specifically, the use of high-speed internet and interactive videoconferencing technology to deliver real-time audio and video communications between the family and the practitioner—is gaining acceptance as an alternative means of providing family-centered early intervention to families of children who are deaf and hard of hearing. This study examined whether caregivers' reported perceptions of self-efficacy and involvement differed when early intervention was delivered in-person and through telepractice. The Scale of Parental Involvement and Self-Efficacy (SPISE) was used to evaluate perceptions of two groups of caregivers: one that received early intervention in-person (n = 100) and a group who received services through telepractice (n = 41). Results indicated that mode of delivery of services was not related to caregivers' perceptions of their self-efficacy or involvement. Further analysis revealed that although certain caregiver or child characteristics did influence some aspects of caregivers' beliefs about their self-efficacy or involvement, the effect of those variables was similar across both modes of delivery.

The provision of timely and appropriate early intervention for children who are deaf and hard of hearing (DHH) is associated with better language, speech, communication, and socialemotional outcomes in childhood (Moeller, 2000; Vohr et al., 2008; Yoshinaga-Itano & Gravel, 2001). In particular, positive outcomes have been associated with early intervention that involves the use of family-centered practices that seek to support the family as a whole, strengthen existing family capacity, and actively involve families in the intervention process (Division for Early Childhood, 2014; Dunst & Espe-Sherwindt, 2016). In 2013, the Joint Committee on Infant Hearing in the United States issued a position statement endorsing the use of such familycentered practices in early intervention for children who are DHH (Joint Committee on Infant Hearing, 2013). In the same year, an expert panel of professionals, parents, and researchers developed an international consensus statement outlining evidencebased principles for supporting families of children who are DHH (Moeller et al., 2013). Together, these two documents provide a

set of standards for best practice and reinforce the importance of family-centered early intervention (FCEI) in the development of young children who are DHH.

The role of the practitioner in a FCEI model is one of the collaborative partnership with the caregiver. By focusing on family strengths, the practitioner seeks to expand the caregiver's confidence and competence in supporting their child's development. Dunst et al. (2002) described two types of professional behaviors frequently used by practitioners in FCEI: relational and participatory practices. Relational practices include clinical features such as active listening, affability, and empathy. Practitioners' attitudes and beliefs about family capacity and competence are also associated with relational practices. Participatory practices include strategies for actively involving families in individualized intervention and empowering them to take responsibility for improving their own family circumstances. In FCEI, family members are seen as equal partners with practitioners, who are capable of making decisions and implementing interventions

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that draw on their capabilities and improve family functioning over time (Dunst et al., 2002). The combined use of relational and participatory practices promotes self-efficacy in families, increases their involvement, and decreases their reliance on professionals.

Traditionally, FCEI has been delivered "in-person" (i.e., when the family and practitioner are physically present in the same room), and services have been provided in a range of locations including the home, community settings, and early intervention centers. More recently, practitioners have been delivering FCEI through "telepractice"-the use of telecommunications technology to provide synchronous, two-way audio and video communications between the family and the practitioner, regardless of where participants may be located. However, there has been relatively little consideration in the research literature of family outcomes when FCEI is delivered through telepractice. In this paper, we investigate whether parental perceptions of their own self-efficacy and involvement in their child's development-two core precepts of FCEI-are affected by intervention mode (i.e., telepractice versus in-person), for families with children who are DHH.

Parental Self-Efficacy

According to Bandura (1977, 1994), self-efficacy relates to a person's belief in their own ability to successfully achieve a particular task or exert influence over events that affect their lives. A person with high self-efficacy has the knowledge or skills required to execute a task as well as the persistence required to complete the task (Desjardin, 2005). Self-efficacy can be developed in four distinct ways, (a) mastery experiences, (b) social modeling, (c) social persuasion, and (d) interpretation of moods and feelings (Bandura, 2008). However, self-efficacy beliefs are influenced by context and can vary across domains. For example, a caregiver who is the Chief Executive of a large company may have high self-efficacy in relation to work tasks, but low self-efficacy in relation to parenting skills. Therefore, development of self-efficacy beliefs should be context-specific and focus on specific tasks or behaviors relative to the situation (Bandura, 1977). In an FCEI paradigm, for example, practitioners typically seek to develop parental self-efficacy using the four methods outlined above by (a) providing opportunities for caregivers to practice supporting their child's development, (b) demonstrating or modeling techniques for supporting the child's development, (c) encouraging caregivers to believe in themselves by creating opportunities for success and providing positive feedback on their efforts, and (d) supporting caregivers to identify and redefine the influence of negative moods and feelings.

In the seminal text, The Young Deaf Child, Luterman et al. (1999) argued that parental self-esteem is an essential element of the child's success, and, hence, all clinical interventions should be aimed at empowering and increasing caregivers' self-confidence. Indeed, as they support their child's ongoing development and early education in a rapidly changing field, caregivers of children who are DHH must develop an array of new knowledge and skills related to domains including technology, audiology, education, therapy, and advocacy among others (Punch & Hyde, 2010). Caregivers who are more self-efficacious perceive that they are competent and confident in supporting their child's development, which, in turn, results in better child outcomes (Desjardin, 2005; Moeller, 2000). In order to investigate the caregiver's perceptions of their self-efficacy in regard to

parenting children who are DHH, Desjardin (2003) constructed a rating scale known as the Scale of Parental Involvement and Self-Efficacy (SPISE) that measures the specific knowledge and skills related to parenting a child who is DHH. The scale has been used subsequently in a series of studies (Desjardin, 2003, 2005, 2006; Desjardin et al., 2006; Desjardin & Eisenberg, 2007). In those studies, caregivers' perceptions of their own self-efficacy were found to be related to the language outcomes of their DHH children. Specifically, a significant relationship was identified between caregivers' perceived self-efficacy and the behaviors they used when interacting with their children.

Parental Involvement

Parental involvement is an essential element of FCEI. Practitioners frequently use participatory help-giving practices to support caregivers to be actively involved in planning and implementing the early intervention session (Dunst et al., 2002). By seeking caregiver input, focusing on caregiver-identified concerns, and facilitating caregiver-child interactions, practitioners are able to provide functional learning opportunities and foster caregiver involvement. Early intervention sessions that include a higher proportion of caregiver-child interactions and greater levels of caregiver engagement are associated with more positive child and family outcomes (Aikens et al., 2015; Basu et al., 2010; Dunst et al., 2007; Roggman et al., 2016). Similarly, higher levels of parental involvement in FCEI have been shown to be related to better developmental outcomes for children who are DHH. Moeller (2000) retrospectively reviewed parental involvement for a group of 112 families who had attended the same FCEI program during a specified period. She found that the level of early parental involvement in FCEI was significantly correlated with later child language outcomes at 5 years of age (Moeller, 2000). Desjardin (2005) also noted the importance of parental involvement in relation to caregiver-child interactions. Caregivers who reported being more involved in their child's early intervention program were more likely to use strategies that facilitated their child's language development, whereas caregivers who reported that they were less involved were less likely to use those strategies (Desjardin, 2005).

The location of services may also influence the level of caregiver involvement. Most families receive FCEI services in their home or at an early intervention center (Division for Early Childhood, 2014). When comparing these two settings, Dunst et al. (2014) found significantly lower levels of involvement when families received services entirely outside of the home compared to families who received some or all of their services in the home. A study by Harrison et al. (2016) reported similar findings showing caregiver participation in home-based services was significantly higher than in any other setting. Basu et al. (2010) reported greater levels of participatory help-giving in home-based sessions including higher levels of collaboration between caregivers and practitioners and more opportunities to incorporate intervention activities within family routines and activities. These findings indicate that parental involvement is greater when services are provided in the home, which suggests the need to facilitate delivery of FCEI in the home whenever possible (Harrison et al., 2016). However, for children who are DHH, the possibility of home-based FCEI may be restricted by a number of known barriers including a lack of appropriate services, geographical inaccessibility, and a shortage of qualified practitioners (Arefadib & Moore, 2017; McCarthy et al., 2019). To overcome this issue, an increasing number of practitioners

are adopting the use of telepractice to provide early intervention services to children and their families in their homes. In fact, a number of recent studies have investigated the use of telepractice to deliver early intervention services to families of children with various disabilities (Ashburner et al., 2016; Behl et al., 2017; Blaiser et al., 2013; Knutsen et al., 2016; McDuffie et al., 2016; Meadan et al., 2016; Rogers et al., 2014; Sutherland et al., 2018; Vismara et al., 2016). Only two of those studies specifically investigated cohorts of children who were DHH (Behl et al., 2017; Blaiser et al., 2013), with each using a rating scale to evaluate family outcomes when FCEI services were provided in the home, either in-person or through telepractice. In both studies, families who received services through telepractice were found to be more engaged than families who received services in-person (Behl et al., 2017; Blaiser et al., 2013). These studies provide preliminary evidence to suggest that telepractice may enhance the delivery of FCEI into the home by increasing the level of parental involvement. However, the overall sample sizes were small (Behl et al., 2017 (N = 48) and Blaiser et al., 2013 (N = 27)), and more evidence is needed to confirm these findings.

The Present Study

Given the importance of parental confidence, competence, and engagement in FCEI for children who are DHH, and the increasing use of telepractice to deliver such intervention, further research is warranted to investigate whether this mode of delivery has any effect on parental self-efficacy and involvement. The purpose of the present study was to explore caregivers' perceptions of their own self-efficacy and involvement in their DHH child's early intervention in two distinct delivery modes: telepractice and in-person. The primary research question was:

 Do caregivers' reported perceptions of self-efficacy and involvement differ when early intervention is delivered through telepractice versus in-person?

Although the main variable under consideration was the mode of service delivery (i.e., telepractice or in-person), it is clear that a number of other variables have been identified in the literature as potentially influencing outcomes for caregivers and children who are DHH, regardless of setting (Ching et al., 2013; Fink et al., 2007; Marion Downs Center, 2011.; Moeller & Tomblin, 2015; Nittrouer, 2009). These variables include caregiver characteristics, child characteristics, and early intervention characteristics, which are listed in Table 1. To account for the potential effect of those variables, the following additional question was posed:

2. Are any differences in perceptions of self-efficacy and involvement between the telepractice and in-person groups of caregivers accounted for by (a) caregiver characteristics, (b) child characteristics, and/or (c) early intervention program characteristics?

Methods

We employed a two-group comparison design using a convenience sample of families drawn from a single large organization that operated two discretely administered early intervention programs: one in-person and one through telepractice. Hence, one group of families received early intervention services exclusively in-person and the other group received early intervention services exclusively through telepractice. Families in the inperson group lived within the organization's defined service area and, although they had the option of accessing services through telepractice, all chose to receive services in-person. Families in the telepractice group lived at a considerable distance from the organization, and opted to receive telepractice services through this organization rather than access in-person services from a different agency in their local area. The dependent variable under consideration was the caregivers' perceptions of selfefficacy and involvement in their child's early development. Subsequent partitioning of the two groups allowed for the examination of the effects of potentially intervening variables related to: (a) caregiver characteristics, (b) child characteristics, and (c) early intervention program characteristics. Ethical approval for this study was gained from the Human Research Ethics Committee at the University of Newcastle (Australia).

Study Context

The conduct of the study within one organization that operated two distinct early intervention programs-in-person and telepractice-allowed for the control of the potential effects of differing program philosophies and service delivery patterns (e.g., participants, frequency, and duration of sessions). Documentation outlining service provision principles for the organization indicated that both programs provided services to the families of children who were DHH from birth to 8 years of age and were designed to be family-centered in nature. Interviews with program managers established that families in both programs were provided with individual sessions of similar duration and frequency. Both programs routinely involved caregiver and child as participants in FCEI sessions. Both managers also confirmed adherence to the organizational philosophy of FCEI and the provision of ongoing professional development opportunities related to family-centered practices for their respective members of staff. Telepractice sessions used high-speed internet and interactive videoconferencing technology to deliver realtime audio and video streams to both the practitioner and the family. Practitioners had access to on-site technical support as required to ensure stable videoconferencing connections with families.

Participants

Eligible participants were defined as the primary caregivers of a child who was: (a) deaf or hard of hearing, (b) between the ages of 2 months and 8 years, and (c) had been enrolled in the two early intervention programs (i.e., either telepractice or in-person) for longer than 2 months. No other exclusion criteria were applied. Based on these criteria, 131 caregivers were identified in the telepractice program and 351 caregivers in the in-person program. All 482 eligible participants were invited to participate in an online survey.

Instruments

An electronic survey comprising two parts was delivered via an on-line platform (surveygizmo.com), which was used to (a) distribute invitations, (b) provide access to the questionnaire, and (c) collate responses. In total, the survey included 42 questions. The first part comprised 17 researcher-developed demographic questions. The remaining 25 questions consisted of the SPISE.

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Table 1	Additional	variables

Child characteristics	Family characteristics	EI characteristics
 Child gender Age at diagnosis Unilateral or bilateral hearing loss Hearing level (better ear average) Age at first hearing aid fitting Device type (HA or CI) Age at El enrolment Presence of additional disabilities 	 Gender of primary caregiver IRSAD Maternal level of education Maternal employment status Home language Home communication mode 	 Duration of enrolment Frequency of sessions Session language Session communication mode

IRSAD = Index of relative socio-economic advantage and disadvantage; EI = Early intervention; HA = Hearing aid; CI = Cochlear implant.

Part 1-Demographics. Questions were presented in short answer or multiple choice formats and sought information across three categories: caregiver characteristics, child characteristics, and early intervention participation data. The questions were derived from two sources: (a) the demographics section of the SPISE and (b) a review of related literature that considered variables that were likely to account for differences in outcomes for young children with hearing loss including the Outcomes of Children with Hearing Loss study (Moeller & Tomblin, 2015), the Childhood Development after Cochlear Implantation study (Fink et al., 2007), the Early Development of Children with Hearing Loss study (Nittrouer, 2009), and the National Early Childhood Assessment Project (Marion Downs Center, 2011), conducted in the United States, as well as the Longitudinal Outcomes of Children with Hearing Impairment study conducted by National Acoustics Laboratory in Australia (Ching et al., 2013).

Part 2—SPISE. The second part of the survey was an electronic version of an existing questionnaire—the SPISE (see Desjardin, 2005 for design and validation information). The SPISE is a selfreport questionnaire consisting of 25 questions that uses a 7point Likert scale to measure caregivers' perceptions of "specific skills necessary to work with their young child with hearing loss and the extent to which parents perceive themselves as involved in skills related to their child's sensory device use and strategies to develop their child's speech-language acquisition" (Desjardin, 2005, p. 197). Allowable responses include a 'not applicable' option of 0 with those items being excluded from the scoring. Responses to the SPISE allow for the calculation of the following four subscale scores:

- Parental Self-Efficacy—Device Use (PSEDU),
- Parental Self-Efficacy—Speech and Language Development (PSESL),
- Parental Involvement—Device Use (PIDU), and
- Parental Involvement—Speech and Language Development (PISL).

These four subscale Scores were calculated for each participant using procedures described in the literature (Desjardin, 2003, 2005) and advised by the instrument's first author (J. Desjardin, personal communication, May 3, 2016).

Procedures

Printed flyers publicizing the research project were provided to families during their usual intervention session. Flyers were also displayed for the duration of the study in common areas including each program's reception area and website. The online survey platform was used to distribute an electronic invitation via email to eligible participants across both programs. After 2 weeks, a reminder email was sent to all caregivers who had not responded to the initial invitation. After 4 weeks, paper copies of the invitation and survey were mailed to participants who had not accessed the online survey. Researchers also contacted these potential participants by telephone or in-person to ensure receipt of the hard-copy invitation and to answer any remaining questions about participation. All of these steps were taken in line with ethical approval to ensure equity of access for caregivers who had limited computer access or a first language other than English. All survey responses, including paper responses, were collated for analysis using IBM SPSS Statistics for Windows, Version 24.0.

Respondents. In total, 141 of the 482 eligible caregivers completed the survey representing an overall response rate of 29%. This number included three caregivers who had two DHH children and completed surveys for each, as well as seven families where both mother and father completed independent surveys for the same child. When respondents were categorized according to the independent variable—mode of service delivery—the groups consisted of 100 caregivers receiving services in-person and 41 caregivers receiving services through telepractice. Although these group sizes seem disparate, they represent proportionally similar response rates: 28.5% for the in-person group and 31% for the telepractice group.

Caregiver characteristics. The majority of respondents were female, English speakers with a university degree who spent some time working outside of the home and lived in relatively advantaged socio-economic areas. Further detail about caregiver characteristics can be found in Table 2. Chi-squared tests were used to evaluate the similarity of the two groups (i.e., in-person or telepractice) on each of the intervening variables. A statistically significant difference was observed in regard to relative socio-economic Advantage as measured by the Index of Relative Socio-economic Advantage and Disadvantage (IRSAD) (Australian Bureau of Statistics, 2016) with a greater number of families in the in-person group living in more advantaged areas and a greater number of families that received telepractice living in less advantaged areas (p < .001).

Child characteristics. Detailed descriptive information for children of the respondents is provided in Table 3. The majority had a bilateral hearing loss of at least moderate degree that was identified and required fitting of hearing aids under the age of 6 months. There were more hearing aid users than cochlear implant users and 7.8% of children had no device. Approximately

Table 2	Caregiver	characteristics	by	group
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Caregiver characteristics	In-person families		Telepractice families		
N = 141	n =	n =100		n = 41	
Caregiver gender					
Female	89	89%	37	90.2%	
Male	11	11%	4	9.8%	
Maternal level of education					
12 years or less of formal schooling	11	11%	6	14.6%	
Advanced diploma or certificate	26	26%	12	29.3%	
University degree	62	62%	23	56.1%	
No response	1	1%	N/A		
Maternal employment status					
Employed outside of the home	54	54%	23	56.1%	
Caring for family full-time	40	40%	17	41.5%	
Unemployed	5	5%	1	2.4%	
No response	1	1%	N/A		
Home language					
Spoken English only	49	49%	23	56.1%	
Includes spoken English	48	48%	18	43.9%	
No spoken English	3	3%	0	0.00%	
IRSAD					
Quintile 1	6	6%	10	2.4%	
Quintile 2	9	9%	9	22.0%	
Quintile 3	19	19%	14	34.1%	
Quintile 4	16	16%	2	4.9%	
Quintile 5	50	50%	5	12.2%	
Living overseas	N/A		1	2.4%	

IRSAD = Index of relative socio-economic advantage and disadvantage.

Note. IRSAD quintiles range from most disadvantaged (Quintile 1) to most advantaged (Quintile 5).

one-third of children presented with another disability in addition to hearing loss. At the time of the survey, most children had been enrolled in early intervention for at least 12 months and received weekly sessions with a practitioner who had supported the family for at least 6 months. When grouped by mode of service delivery (i.e., telepractice or in-person), chisquared tests indicated that the two child cohorts differed significantly on just three of the additional variables under consideration. In regard to degree of hearing loss (i.e., fourfrequency pure tone average in the better ear), a greater than expected number of children in the in-person group presented with a mild or moderate degree of hearing loss compared to the telepractice group where a greater than expected number of children presented with severe or profound hearing losses (p = .02). For device type, the in-person group had a higher than expected number of hearing aid users, whereas the telepractice group had a higher than expected number of cochlear implant users (p = .04). Finally, with regard to session frequency, a greater than expected number of families in the in-person group attended fortnightly sessions whereas the telepractice group had a higher than expected number attending less than monthly (p = .006).

Results

In order to address the primary research question, multivariate analysis (MANOVA) was used to determine whether parental self-efficacy and involvement varied as a function of intervention mode. Self-efficacy and involvement were defined as the four subscale scores on the SPISE, (a) PSEDU, (b) PSESL, (c) PIDU, and (d) PISL. Intervention mode was defined as either telepractice or in-person. Figure 1 shows a graph of the mean scores and standard deviations for each subscale of the SPISE for the two groups: telepractice and in-person.

MANOVA analysis showed that delivery mode had no significant effect overall on subscale scores (Wilk's lambda 0.94, F(4,136) = 0.35, p = 0.84). Individual ANOVA tests showed no significant differences between the telepractice and in-person groups for any of the four SPISE subscales (F(1,139) = 0.89, 0.54, 0.13, 0.17, respectively, p = 0.35, 0.47, 0.72, 0.68, respectively.) Table 4 provides the summary statistics, effect sizes, and confidence intervals for the difference between the SPISE subscale scores for caregivers in the two modes.

In addition to the primary research question, a number of other variables were considered that have been identified in the research literature as potentially affecting outcomes for families of children who are DHH. As noted, these variables were related to (a) caregiver characteristics, (b) child characteristics, and (c) early intervention characteristics. A further series of multivariate analyses was completed for each of these additional variables to determine whether there was any interaction with service delivery mode. No significant interactions were found for any of the additional variables, with the exception of laterality of hearing loss. Analysis of individual ANOVA tests indicated a significant difference for one subscale (PSEDU) (p = .003) suggesting that parents of children with unilateral hearing loss in the telepractice group were more likely to report lower levels of selfefficacy with regard to their child's device use. It is noteworthy, however, that there were only six respondents with children with unilateral hearing loss in the telepractice group, suggesting that the observed interaction was not a true effect but rather a Type I error.

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Table 3 Child characteristics by group

Child characteristics	In-perso	n children	Telepractice children n = 41		
N = 141	n =	= 100			
Child gender					
Female	51	51%	18	43.9%	
Male	49	49%	23	56.1%	
Laterality of hearing loss					
Unilateral	18	18%	6	14.6%	
Bilateral	82	82%	35	85.4%	
Degree of hearing loss (better ear)					
Within normal limits	17	17%	6	14.6%	
Mild	19	19%	5	12.2%	
Moderate	26	26%	3	7.3%	
Severe	15	15%	12	29.3%	
Profound	21	21%	15	36.6%	
Age at diagnosis	1777) 1777)			- and the second s	
<6 months	79	79%	37	90.2%	
>6 months	21	21%	4	9.8%	
Age at first hearing aid fitting		2270	· • · ·	2.070	
6 months	63	63%	29	70.7%	
6 months	26	26%	11	26.8%	
Never fitted	20	11%	1	20.0%	
Age at FCFL enrolment		1170	1	2.170	
-6 monthe	52	52%	17	A1 5%	
<6 months	JJ 17	JJ 7%	24	58 5%	
Duration of ECEL aprolment	47	17 /0	27	50.576	
Loss than 6 months	10	10%	2	7.2%	
6 12 months	19	10%	2	10 E%	
12 18 months	19	1978	6	19.3%	
12-18 months	3 10	376 109/	7	17.0%	
16-24 monules	12	12 /0	17	17.1%	
Derige time	41	41/0	17	41.5%	
No device	10	10%	1	0.4%	
No device	10	10%	1	2.4 /0	
Hearing aids only (1 or 2)	58	58%	18	43.9%	
	32	3270	22	53.7%	
Frequency of FGEI sessions	a	(70)	00	60.00/	
weekiy	67	67%	28	68.3%	
Fortnightly	23	23%	4	9.8%	
Monthly	/	1%	2	4.9%	
Less than monthly	3	3%	/	17.1%	
Presence of additional disabilities		2004		(D. 04)	
Yes	8	38%	13	68.3%	
No	62	62%	28	31.7%	
Gommunication mode	- <u></u> -	12212	100		
Aural/oral only	78	78%	28	68.3%	
Oral and sign	22	22%	13	31.7%	

FCEI = family-centered early intervention.

Table 4 Summary statistics, effect size as Cohen's d and 95% CI for the difference between the two approaches

Variable Telepra M (S	Telepractice	In-person	Mean diff (T – I)	95% CI		Cohen's d
	M (SD)	M (SD)		LL	UL	
Subscale 1 (PSEDU)	5.56 (0.97)	5.38 (1.07)	0.18	-0.20	0.56	0.17
Subscale 2 (PSESL)	6.03 (0.75)	5.90 (0.99)	0.13	-0.21	0.47	0.14
Subscale 3 (PIDU)	5.68 (0.88)	5.74 (0.93)	-0.06	-0.39	0.27	-0.07
Subscale 4 (PISL)	5.83 (0.71)	5.77 (0.83)	0.06	-0.23	0.36	0.08

Note. N = 141 (telepractice n = 41; in-person n= 100), Cohen's d using pooled SD weighted by sample size; CI=confidence interval; LL=lower limit, UL = upper limit; SD=standard deviation; PSEDU=Parental Self-Efficacy—Device Use; PSESL=Parental Self-Efficacy—Speech and Language Development; PIDU=Parental Involvement— Device Use; PISL=Parental Involvement—Speech and Language Development.



Figure 1 Means and standard deviations of SPISE subscale scores for telepractice (n = 41) and in-person (n = 100) groups.

As previously noted, chi-squared analysis of the distribution of participants across the two main groups indicated statistically significant differences between the composition of the telepractice and in-person groups in regard to relative socioeconomic advantage, degree of hearing loss, device type, and session frequency. Notably, there were no significant interactions between any of these four variables and delivery mode. In terms of their independent effects for the entire sample, however, MANOVA analysis showed significant main effects for individual subscales for three of the four variables. There were no significant findings related to session frequency; however, relative socio-economic advantage, device type, and degree of hearing loss were significant. Relative socio-economic advantage was significant for the two subscales relating to parental self-efficacy and involvement in their children's speech and language development: PSESL (p = .04) and PISL (p = .02). Degree of hearing loss was significant for the two subscales relating to parental self-efficacy and involvement in device usage: PSEDU (p=.02) and PIDU (p=.02). Device type was significant only in regard to parental self-efficacy in device usage: PSEDU (p < .001). Although these variables individually influenced scores for particular aspects of parental self-efficacy and involvement for the sample as a whole, it is important to note that there was no indication that they operated differentially in either delivery mode.

Discussion

The purpose of this study was to examine caregivers' perceptions of self-efficacy and involvement in two distinct early intervention models: in-person and telepractice. Analysis of caregivers' scores on four subscales of the SPISE indicated that there were no significant differences between caregivers' reported levels of self-efficacy and involvement when early intervention was delivered in-person versus telepractice. With the possible exception of unilateral/bilateral hearing loss, there were no significant interactions between intervention mode and any of the other variables considered in relation to characteristics of the caregiver, child, or early intervention program. The findings related to laterality of hearing loss may represent a true interaction effect, but the small and uneven nature of the group sizes limits the statistical power available for this particular comparison. Further investigation with a larger sample size would be required to determine whether the result reported here represents a true

difference. Practically speaking, this study demonstrated that caregivers' perceptions of their self-efficacy and involvement in their child's early development are not likely to differ between telepractice and in-person sessions (see Table 4 for mean differences and 95% confidence intervals).

The results reported here suggest that there is no difference between caregivers in telepractice and in-person settings in regard to their perceived self-efficacy and involvement in their child's early intervention. There were no significant differences between SPISE scores when results were analyzed by service delivery mode. Caregivers receiving services in a telepractice mode reported levels of self-efficacy and involvement that were similar to those of caregivers receiving services in-person. With one exception (laterality of hearing loss), these results remained consistent even when intervening variables related to caregiver, child, and early intervention characteristics were considered. Although further research is required to confirm these results, this study provides encouraging evidence that there is no difference between in-person and telepractice delivered early intervention services in the important dimensions of caregiver selfefficacy and involvement.

Although not a focus of this study, there were some interesting findings in regard to the relationship between parental self-efficacy and involvement and some of the other variables that were considered, regardless of mode of delivery. Specifically, caregivers from more disadvantaged backgrounds reported significantly lower levels of self-efficacy and involvement in their child's speech and language development. In regard to device use, caregivers of children with cochlear implants and caregivers of children with profound hearing loss reported higher levels of self-efficacy in their child's device use than other caregivers. Finally, caregivers of children with minimal hearing loss reported lower levels of involvement in their child's device use. Further investigation of these relationships, and the possible reasons for them, could usefully form part of a broader investigation of the factors associated with the effective application of FCEI practices with DHH children but are beyond the scope of the present study.

This study builds on the existing literature on the use of telepractice to deliver FCEI to children who are DHH by providing evidence that addresses many of the limitations of previous studies. Specifically, this study used a convenience sample within one organization, which meant that there was no potential for variability within or between the two groups in regard to program philosophy, service delivery patterns, reliability and stability of technology, and family experience with telepractice. This approach differed from Behl et al. (2017) where data were collected across five different organizations, and differences in these variables were noted across organizations. In addition, the present study included a larger sample (N = 141) than previous studies (Behl et al., 2017 (N = 48) and Blaiser et al., 2013 (N = 27)).

The results presented here suggest a number of practical implications. First, this study indicates that high levels of caregiver self-efficacy and involvement can be achieved through telepractice for caregivers of children who are DHH. Consequently, practitioners can be reassured that the use of telepractice can support FCEI for children who are DHH. Furthermore, caregivers in this study reported similar levels of self-efficacy and involvement regardless of service delivery mode. These results support the use of telepractice as an acceptable alternative for delivering FCEI. Research has demonstrated a number of benefits associated with providing services into the home (Dunst et al., 2014), and telepractice offers another approach to providing FCEI in the home setting, particularly in areas where local services are not available for children who are DHH. Finally, the findings related to relative socio-economic advantage, degree of hearing loss, and device type were independent of delivery mode. This suggests that both telepractice and in-person modes are able to effectively support delivery of FCEI to a range of families.

Limitations and Future Research Directions

This study used an intact sample within one organization. This sampling method was chosen deliberately to achieve the largest possible cohort while also controlling for a range of variables that may have otherwise influenced the research results. Those variables included differences in program philosophy, inconsistencies in service delivery patterns, reliability and stability of telepractice technology, and caregiver experience with a telepractice service model. Although using an intact sampling approach might be considered a limitation of the study, it served well to reduce the potential extraneous influence of these variables. Future studies might consider sampling across different programs to investigate these and other potentially intervening variables and add evidence for the generalizability of these findings.

The results of this study derive from data collected using a self-report tool to measure parental self-efficacy and involvement. The selected instrument was specifically designed to measure the perceptions of caregivers of children who are DHH. In this case, it was used with both groups for a between-groups comparison of outcomes on the same measure. Nevertheless, it is acknowledged that more widespread use of the scale is required to provide comprehensive information about its reliability and validity as a measure of these constructs. To this end, future research could expand on the results of this study through the collection of complementary observational data to substantiate the findings using the self-report instrument.

This study specifically investigated caregivers' beliefs about their own self-efficacy and involvement, but did not consider the practitioner behaviors that support the development of those beliefs. Future research might consider a comparative study examining the relationship between techniques and strategies used by practitioners and caregivers' perceived levels of self-efficacy and involvement. Such a study would allow researchers to consider the influence of practitioner behaviors on family outcomes.

This study was able to investigate a cohort of considerable size in comparison to other previous studies. In statistical terms, however, the sample size was still relatively small. The overall findings related to delivery mode were robust, but it is important to note that secondary analysis of other variables reported here may have been influenced by small or uneven group sizes. Although such findings were neither a principal aim nor a primary conclusion of this study, such differences as have been reported might represent Type I errors. Further research with larger sample sizes is required to fully investigate the potential relationships between these additional variables and parental self-efficacy and involvement. For example, it is possible that some of the significant variables (e.g., degree of hearing loss and device type) may be related to each other, and further investigation is warranted. Replicating this study with a larger cohort would provide greater statistical power as a basis for verifying the findings from this study.

Conclusion

This study sought to determine whether caregivers' reported perceptions of self-efficacy and involvement in their DHH children's development differed when early intervention services were delivered through telepractice or in-person. It also sought to identify the possible influence of a range of other variables on any relationship between caregivers' perceptions of self-efficacy and involvement and mode of service delivery. The overarching finding was that delivery mode was not related to caregivers' perceptions of their self-efficacy and involvement. Indeed, caregivers reported similarly high levels of self-efficacy and involvement in the care of their DHH children regardless of whether their early intervention services were delivered in-person or via telepractice. With regard to the influence of other variables, it would appear that, although certain caregiver or child characteristics did influence beliefs about self-efficacy or involvement in areas such as device use and speech and language development, the effect of those variables was similar across both modes of delivery. These findings provide support for the conclusion that FCEI can be delivered through telepractice in a manner that is as effective as services delivered in-person, at least in regard to promoting caregiver's self-efficacy and engagement in the development of their DHH children.

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Conflicts of Interest

No conflicts of interest were reported.

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4.2.1 Further Research

The study reported in Article 3 provided self-assessment results from 141 caregivers on an existing instrument that was designed specifically for parents of children who are DHH-the Scale of Parental Involvement and Self-Efficacy (SPISE). As noted in the Limitations section, the SPISE has not been used widely for research purposes, and requires further validation. Notably, Ambrose et al. (2020) have recently revised and expanded the original SPISE instrument to develop a new instrument, the SPISE-R. They administered the new instrument to a group of 72 caregivers to evaluate their perceptions of their own beliefs, knowledge, confidence, and actions, in relation to their children's listening and language development. The beliefs section did not result in summary scores, whereas the other three sections did. Internal consistency for those three sections (i.e., knowledge, confidence, and actions) was calculated using Cronbach's alpha and indicated good reliability ($\alpha = 0.89, 0.92, 0.92$ respectively) (Ambrose et al., 2020). Knowledge and confidence scores were strongly correlated, and several associations were found between demographic characteristics and caregivers' beliefs, knowledge, and confidence. In addition, action scores were significantly correlated with knowledge and confidence scores as well as two specific beliefs (Ambrose et al., 2020). Although additional research is needed to confirm the validity of the SPISE-R, the revisions build on the original instrument to help practitioners better understand the relationships between caregivers' self-efficacy and involvement in supporting the listening and language development of their children who are DHH.

4.3 Chapter summary and conclusion

The article presented in this chapter reported a study designed to address Research Question 3—*Do caregivers' reported levels of self-efficacy and involvement differ when early intervention is delivered through telepractice versus in-person?* The reported levels of self-efficacy and involvement of caregivers this study did not differ when services were provided in-person or through telepractice. These findings support the conclusion that caregivers who access FCEI through telepractice can achieve levels of self-efficacy and involvement that are consistent with those who access services inperson. Further, they support the proposition that telepractice can be viewed as a viable means of promoting caregiver self-efficacy and involvement in accordance with the principles of FCEI.

Self-report data, such as that recorded by the SPISE for caregivers or the MPOC-SP for practitioners, provides only one measure of participants' behaviours. The collection and analysis of objective data through direct observation of those behaviours would supplement the self-assessment results reported here. In addition, the SPISE specifically examines caregivers' beliefs about their self-efficacy and involvement, but does not address the influence of those beliefs on their behaviours. Likewise, the MPOC-SP describes practitioners' use of specific practices, but does not consider the relationship of those practices with caregivers' behaviours. Observational data could be used to examine the relationship between practitioners' and caregivers' behaviours in greater detail. These topics are the focus of Chapter 5, which describes the collection and analysis of observational data to confirm caregivers' self-assessment of their selfefficacy and involvement and to examine the relationships between caregivers' and practitioners' behaviours.

CHAPTER 5: TRIADIC INTERACTIONS

5.1 Introduction

This chapter emphasises the concept of triadic interaction and examines the behaviours demonstrated by practitioners and caregivers, and the potential resulting relationships that develop between practitioners, caregivers, and children during FCEI sessions. Triadic interaction describes the collaborative partnership between practitioner and caregiver that forms the basis for FCEI. In this partnership, practitioners demonstrate a range of family-centred practices, as described in Chapter 3, which support caregivers' confidence and competence to participate actively in facilitating their children's early development, as described in Chapter 4. Article 4 included in this chapter examines practitioners' use of specific family-centred practices, caregivers' use of specific participation behaviours, and the nature of the possible relationships between those two sets of behaviours when FCEI is delivered through telepractice or in-person.

5.2 Article 4: Comparison of observed participant behaviors in telepractice and inperson early intervention

The fourth article presented in this thesis describes a comparative study that addresses Research Questions 4 to 6. For the purpose of this study, participants were defined as *triads* consisting of a practitioner, a caregiver, and a child. Observational data were collected for two groups of triads who participated in FCEI either in-person or through telepractice. In order to answer Research Question 4—*What family-centered strategies do practitioners use and do these differ when services are delivered in telepractice or in-person?*—and Research Question 5—*What participation behaviours do caregivers demonstrate and do these differ when services are delivered in telepractice or in-person?*—data were analysed using the Triadic Implementation Evaluation Rating Scale (TIERS). Subsequent data analysis was conducted to investigate Research Question 6—*Does the use of specific strategies by practitioners affect caregivers' participation behaviours and does this relationship vary between delivery modes?* Study design, methods, results, and discussion are reported in the article.

Article 4 included in this chapter is the unaltered authors' version of the manuscript for the article as submitted for peer review and publication. The manuscript was submitted to a journal that conforms to US standard spelling, and the version presented here is consistent with that editorial policy.

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Abstract

Family-centered early intervention (FCEI) is characterized by the collaborative relationships that exist within triads of practitioners, caregivers, and young children whereby practitioners use capacity-building practices to foster caregivers' involvement in supporting their children's early development. Traditionally, FCEI has been provided *in-person* with practitioners and families physically present in the same location but, for children who are deaf or hard of hearing, access to in-person early intervention is often limited by external factors. To address these challenges, practitioners are using telepractice more frequently to connect with families through synchronous, two-way videoconferencing. This study examined whether participants' behaviors differed when FCEI was delivered in-person and through telepractice. The Triadic Intervention Evaluation Rating Scale (TIERS) was used to compare two groups of triads (16 inperson and 13 telepractice) in terms of practitioner behaviors, caregiver behaviors and the reciprocal influences of those behaviors. Results indicated that practitioners in telepractice used family-centered practices more frequently than practitioners in-person. Correspondingly, caregivers in telepractice had more opportunities to participate in early intervention and more frequently demonstrated a variety of participation behaviors than caregivers in-person. These findings suggest that FCEI provided through telepractice may enhance practitioners' use of family-centered practices, which, in turn, supports greater participation by caregivers.

Keywords: Family-centered, early childhood intervention, telepractice, deaf, hard of hearing, videoconferencing, capacity building, caregiver engagement, TIERS

Comparison of observed participant behaviors in telepractice and in-person early intervention

The goal of early childhood intervention is to provide services that support the child's overall development and enable meaningful participation within their family and community (Division for Early Childhood, 2014; Early Childhood Intervention Australia, 2016; Moeller, Carr, Seaver, Stredler-Brown, & Holzinger, 2013). Early intervention includes the development of language and communication skills: a component which is critical for young children who are deaf or hard of hearing (DHH). The internationally accepted standard for achieving these aims is the use of a familycentered approach which has been endorsed by peak bodies in health, education, and deafness (S. Brown & Guralnick, 2012; Moeller et al., 2013; Joint Committee on Infant Hearing (JCIH), 2013). Also known as "family-centered early intervention" or FCEI, the approach is characterized by key principles known to influence child and family outcomes including building family capacity, enhancing family well-being, focusing on family strengths, and working in partnership with families (Division for Early Childhood, 2014; JCIH, 2013; Moeller et al., 2013). Practitioners who provide FCEI use specific practices—including help-giving practices, coaching strategies, and collaboration-to enhance caregivers' confidence, competence, and involvement in supporting their child. FCEI is typically delivered within the context of family routines and everyday activities to provide authentic learning experiences and promote generalization of skills. The FCEI approach is particularly relevant for children who are DHH because it promotes an optimal environment for early language development, which typically occurs within the context of social interactions with significant communication partners (e.g., primary caregivers) (American Speech-LanguageHearing Association (ASHA), 2008; Dunst, Valentine, Raab, & Hamby, 2013; Moeller et al., 2013).

Traditionally, FCEI has been provided "in-person" where the practitioner and family are physically present in the same room, but, for children diagnosed with lowincidence disabilities (i.e., those who are DHH), access to in-person early intervention is often limited by geographical barriers, workforce shortages, and a lack of appropriate services (Arefadib & Moore, 2017; Bush, Kaufman, & McNulty, 2017; JCIH, 2013, 2019). In answer to these challenges, telepractice has emerged as an alternative mode for the delivery of FCEI. In this mode of delivery, practitioners and families are connected synchronously through technology even though they are physically distant from one another. Despite the increasing use of telepractice to provide parent training in early intervention (Ashburner, Vickerstaff, Beetge, & Copley, 2016; McDuffie et al., 2016; Meadan et al., 2016; Vismara et al., 2016), there is relatively little research evidence to support the use of telepractice for the purpose of providing FCEI, specifically to children who are DHH (McCarthy, Leigh, & Arthur-Kelly, 2019). In this paper we investigate whether the patterns of use of FCEI practices by professionals and the participatory behaviors of caregivers are affected when early intervention services for children who are DHH are delivered through telepractice, rather than in-person.

Capacity-Building Practices

A defining characteristic of FCEI is practitioners' use of capacity-building practices to support caregivers to develop their knowledge, skills and abilities to promote their child's learning and development (Dunst, Bruder, & Espe-Sherwindt, 2014). Family capacity-building is achieved through practitioners' use of a range of different strategies, methods, and procedures (Dunst et al., 2014). One such strategy is the use of help-giving practices that aim to enhance caregiver competence and confidence and strengthen the caregivers' role in supporting their child's development by enhancing parental self-efficacy (Dunst, 2002; Dunst, Boyd, Trivette & Hamby, 2002). Help-giving practices are categorized as either *relational*, which focus on relationship-building and emphasize good clinical practices such as empathy, compassion and respect; or *participatory*, which focus on building family-capacity and include strategies that are flexible and responsive to individual family needs and empower families to be actively involved in the intervention process (Dunst, 2002; Dunst et al., 2002; Dunst, Trivette, & Hamby, 2007). A meta-analysis by Dunst et al. (2002) found that, although a family-centered model incorporates both types of help-giving, greater use of participatory help-giving practices corresponded to higher levels of family-centeredness.

Coaching is another type of capacity-building practice that can strengthen and support caregivers' ability to foster their child's learning and development (Basu, 2007; J. Brown & Woods, 2016). Coaching includes a range of strategies such as explanation, demonstration, joint problem-solving, scaffolding, observation and feedback, guided practice, and reflection (Basu, Salisbury, & Thorkildsen, 2010; J. Brown & Woods, 2016; Stewart & Applequist, 2019). Each of these strategies provides an opportunity for caregivers to acquire new knowledge, implement new skills, or apply their knowledge and skills to new situations. For caregivers of children who are DHH, coaching facilitates self-efficacy in developing the knowledge and skills necessary to independently support their child's acquisition of language (Ambrose, Appenzeller, Kai, & DesJardin, 2020; King and Xu, 2019).

A third technique that practitioners can employ to build caregiver capacity is to promote the use of everyday routines and activities within familiar environments as a means of enhancing interactions between caregivers and children who are DHH. For example, practitioners might model various ways in which caregivers can elicit and sustain eye contact during a mealtime with their child as a precursor to a conversation. Embedding capacity-building within the context of daily life supports the generalization of caregiver skills beyond the early intervention session and increases the child's opportunities for learning and language development in relevant and meaningful situations (ASHA, 2008; Dunst et al., 2013; Kellar-Guenther, Rosenberg, Block, & Robinson, 2014). An important consideration in this context is the skill of the practitioner in both explaining and modelling naturally occurring opportunities for engagement with the child in a productive manner that enhances learning.

Even when practitioners express a strong belief in the use of such familycentered practices, their implementation of those practices may not match their stated beliefs or intentions (Colyvas, Sawyer, & Campbell, 2010; Fleming, Sawyer, & Campbell, 2011; Ingber & Dromi, 2010). Some practitioners continue to use predominantly practitioner-led intervention strategies—such as direct teaching of the child, using materials provided by the practitioner, and relying on practitionerdetermined activities—in spite of evidence to the contrary that endorses the use of family-centered practices in early intervention (Salisbury & Cushing, 2013; Dunst et al., 2007). In the context of the emergent use of telepractice to deliver FCEI, there are questions also about the possible impact on practitioners' use of capacity-building practices to establish a supportive relationship with families, and on both caregivers' responsiveness and children's level of engagement (Akamoglu, Meadan, Pearson, & Cummings, 2018; Cole, Pickard, & Stredler-Brown, 2019; Freckman, Hines, & Lincoln, 2017; Hines et al., 2015).

Caregiver Responsiveness

Practitioners' use of strategic and considered capacity-building practices of the type identified in the previous section have been shown to facilitate caregivers' acquisition and use of responsive behaviors with their child. A meta-analysis by Dunst and colleagues (2019) indicated that practitioners' use of participatory help-giving strategies enhanced caregivers' self-efficacy beliefs, which led to more effective caregiver-child interactions, and, ultimately, improved developmental outcomes for the child. Indeed, the extent and quality of caregiver's level of responsiveness to their child, within the context of the early intervention session and in everyday interactions more generally, have been shown to be associated with positive child outcomes, particularly in the areas of receptive and expressive language and nonverbal communication. Raab, Dunst, Johnson, and Hamby (2013) conducted a meta-analysis of research on this relationship and concluded that caregivers' use of six specific interaction behaviors was positively associated with communication and language outcomes for all children, with the strongest effect sizes noted for children with disability or delay, including children who are DHH. These six responsive behaviors included caregiver sensitivity, following the child's lead, contingent responsiveness, caregiver-child mutuality, support/encouragement, and behavior elaboration.

Collaborative Partnerships

Given the importance of caregivers' use of specific behaviors in facilitating their child's developmental outcomes (Raab et al., 2013), and the link between their efficacy in using those behaviors and practitioners' use of capacity-building practices (Dunst et al., 2002; Dunst et al., 2007); there is a clear need to consider the nature and efficacy of the relationship between these two important players in the triad of participants in the early intervention experience (i.e., practitioner, caregivers, and child). The triadic nature

of participant relationships within the FCEI model has been examined in several studies. J. Brown and Woods (2016), found that when practitioners used specific coaching strategies (e.g., observation and practice with feedback), caregivers were most likely to use the targeted intervention strategies. Further, they discovered that, when practitioners used more child-focused or conversational strategies, caregivers were less likely to participate (J. Brown & Woods, 2016). Consistent with those findings, Kellar-Guenther and colleagues (2014) found that caregivers were more likely to participate in early intervention sessions when practitioners used coaching strategies that related specifically to the interactions occurring between caregiver and child during the session. Basu et al. (2010) developed an instrument to evaluate the triadic interactions occurring within an early intervention session. In their development of the Triadic Implementation Evaluation Rating Scale (TIERS) they found that 15 of the 21 practitioner behaviors that demonstrate confidence and competence in facilitating child participation (Basu et al., 2010).

FCEI and Telepractice

Children who are DHH experience widely varied levels of access to qualified early intervention practitioners and appropriate FCEI services because of a range of factors (Arefadib & Moore, 2017; Bush et al., 2017; JCIH, 2013, 2019). In particular, the mismatch between the diverse needs of a widely dispersed population of children who are DHH and the uneven distribution of practitioners who are qualified to meet those needs has limited access to services for many children and their families. As noted in the introduction, telepractice—the use of synchronous audio and video technology to connect families in one location with practitioners in another—has been advanced as a solution to this problem. A number of studies have described the suitability of telepractice to teach caregivers of children with developmental delays and disabilities to implement specific parent-mediated interventions related to behavior, language, and social communication (Akemoglu et al., 2020; Ashburner et al., 2016; Hao, Franco, Sundarrajan, & Chen, 2020; Little, Pope, Wallisch, & Dunn, 2018; McDuffie et al., 2016; Rook-Ellis, Howorth, Boulette, Kunze, & Sulinski, 2020; Vismara et al., 2016). Given that language and communication are critical areas of developmental risk for children who are DHH, this research is relevant, however, it does not address the specific intervention needs of this group.

To date, only six studies—three based on self-assessments and three observational studies—have specifically investigated the family-centeredness of early intervention delivered through telepractice for children who are DHH. The earliest study examined practitioners' beliefs about family-centered practices and caregivers' selfassessment of their family functioning (P. Brown & Remine, 2008). The practitioners (n = 27) reported strong beliefs regarding most aspects of family-centered practices including working collaboratively with caregivers. The caregivers included 16 families who had received center-based services and 8 families who had received services through telepractice. All families rated themselves highly on family functioning, and there were no significant differences between the two groups (P. Brown & Remine, 2008). Two more recent studies employed self-assessment instruments to examine the degree of family-centeredness in FCEI for children who are DHH by practitioners and caregivers respectively (McCarthy, Leigh, & Arthur-Kelly, 2020a; McCarthy, Leigh, & Arthur-Kelly, 2020b). The first study compared a group of practitioners (n = 23) that delivered FCEI services entirely in-person and another group (n = 15) that delivered services through telepractice (McCarthy et al., 2020b). There were no significant

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differences between the two groups with both reporting similar levels of use of familycentered practices. The second study examined whether caregivers' self-reported levels of self-efficacy and involvement differed when early intervention was delivered either in-person or through telepractice (McCarthy et al., 2020a). One group (n = 100) received FCEI in-person and the other group (n = 41) received FCEI through telepractice. Overall, the caregivers reported high levels of self-efficacy and involvement in their children's early development, with no significant difference between the two groups.

Turning to studies that reported on direct observation of participants in FCEI, Stredler-Brown (2017) used video analysis to investigate the frequency of use of four specific FCEI behaviors in telepractice. Observations of 16 practitioners who provided FCEI through telepractice were compared to data reported in the literature for practitioners providing FCEI in-person. Only one behavior-direct instruction-was used less frequently in telepractice than in-person. The other three behaviors observation, caregiver practice with feedback, and child behavior with practitioner feedback were used more frequently in telepractice than in-person (Stredler-Brown, 2017). These findings complement two additional studies that directly assessed and compared the behaviors of practitioners and caregivers in FCEI for children who are DHH in-person and through telepractice (Behl et al., 2017; Blaiser, Behl, Callow-Heusser, & White, 2013). Researchers in both studies used the Home Visit Rating Scales—Adapted and Extended (HOVRS-A+) by Roggman et al., (2010) to examine practitioner and family behaviors in the two modalities (Behl et al., 2017; Blaiser et al., 2013). The study by Blaiser et al. (2013) found no statistically significant differences, as measured by the HOVRS-A+, between practitioner behaviors in the two conditions, suggesting that mode of service delivery did not affect practitioners' use of familycentered practices. The study by Behl et al. (2017) showed practitioners were more

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responsive to families when providing services through telepractice, suggesting that FCEI delivered through telepractice may better support practitioners' use of familycentered practices with families of children who are D/HH. In both studies, families who received services through telepractice demonstrated higher levels of engagement than families who received services in-person (Behl et al., 2017; Blaiser et al., 2013).

Taken together the findings from these six studies provide preliminary evidence to suggest that FCEI delivered through telepractice is able to support, or might even enhance, practitioners' use of family-centered practices with families of children who are D/HH, and increase families' level of engagement.

The Present Study

The present study sought to build on the existing research by exploring whether there were any differences between FCEI practices exhibited by practitioners in telepractice and in-person settings in terms of type or frequency, and whether there was any effect of those differences on caregivers' participation behaviors. The following research questions were asked:

- What family-centered strategies do practitioners use when early intervention are sessions delivered through telepractice and in-person and do these strategies differ between delivery modes?
- What participation behaviors do caregivers demonstrate when early intervention sessions are delivered through telepractice and in-person and do these behaviors differ between deliver modes?
- Does the use of specific strategies by practitioners affect caregivers' participation behaviors when early intervention sessions are delivered through telepractice or in-person, and does this relationship vary between delivery modes?

Method

Design

This study employed a two-group comparison design, drawing participants from those engaged in a previous study. One group of participants (i.e., practitioners, caregivers, and children) engaged in early intervention services in-person and the other group engaged in services through telepractice. The variables of interest were the type and frequency of occurrence of behaviors demonstrated by the participants in each mode. Ethical approval for this study was obtained through the Human Research Ethics Committee (HREC) at The University of Newcastle (Australia).

Study Context

In order to control for the potential effects of differing program philosophies and service delivery patterns (e.g., participants, frequency, and duration of sessions), this study was conducted within a single large, well-established organization that offered two distinct early intervention programs for children who are DHH: one through telepractice and one in-person. The programs employed two separate groups of practitioners and were administered by two different managers. However, both programs adhered to the same overarching organizational policies regarding service delivery patterns, professional development of staff, and commitment to a familycentered approach in the provision of early intervention services.

Families in both programs typically received early intervention sessions for one hour each operating week, equating to approximately 40 sessions per year. All sessions included the child and caregiver and, in both programs (i.e., telepractice and in-person), families had the option to access early intervention services either in their home or at a local center. In this study sample, all the participating families that received early intervention through telepractice accessed their services at home, and all the participating families that received early intervention services in-person accessed their services in a center.

Practitioners in both programs were provided with a biweekly professional development program that was responsive to the needs of their respective teams. This regularly included joint sessions involving staff from both programs that focused specifically on the use of family-centered practices. In addition, practitioners in the telepractice program undertook training and mentoring in the use of telepractice, according to a defined protocol (McCarthy, 2013).

Telepractice sessions utilized high-speed internet connections coupled with interactive videoconferencing technology to ensure all participants had access to synchronous audio and video signals in real time. Families received technical support during the initial set-up of technology to confirm correct installation, appropriate functionality, and adequate internet bandwidth to support telepractice sessions. At the start of their engagement in telepractice, families participated in a practice session to learn procedures for operating the technology and participating in videoconference sessions. During regularly scheduled telepractice sessions, practitioners had access to dedicated, on-site technical support to manage any technical difficulties, including issues arising with the families' technology.

Participants

In order to investigate the triadic nature of early intervention for children who are DHH, the participants in this study included families engaged in early intervention (i.e., caregivers and children) and the practitioners who provided their regular early intervention services. Participants were drawn from related groups of caregivers and practitioners who had participated in a previous study by completing a survey about their experience of family-centered practices in early intervention for children who are

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DHH. For this study, a subset of those survey respondents was invited to participate in this additional phase of investigation. Eligible caregiver participants included all those whose child was:

(a) D/HH, with no other developmental concerns identified,

(b) between the ages of two months and eight years (i.e., consistent with the definition of early childhood by the Division for Early Childhood of the Council for Exceptional Children),

(c) enrolled in one of the two early intervention programs (i.e., either telepractice or in-person) for longer than two months,

(d) receiving early intervention sessions at least monthly, and

(e) using spoken English as the primary language of the early intervention session.

Using these criteria, 68 eligible caregivers were identified (38 in-person and 30 telepractice) and invited to participate in the research. The practitioners who provided regular early intervention services to those 68 families were subsequently invited to participate. The eligible practitioner group included 27 practitioners—11 professionals who were providing FCEI through telepractice and 16 in-person. There were 31 caregivers who consented to participation in the study. This included two caregivers— one in-person and one in telepractice—who had two children enrolled and attended separate sessions with each child. Ultimately, the consenting participants comprised 29 caregiver-child dyads (16 in-person and 13 telepractice) who were supported by 17 consenting practitioners (11 in-person and 6 in telepractice). Additional demographic details are provided in Tables 1-3.

Chi-square tests were used to evaluate the similarity of the two groups on each of the variables listed in Tables 1-3. No significant differences were observed between

Child characteristics	In-ners	on	Telepra	rtice
N = 29	n = 16	011	n = 13	
Child gender	<i>n</i> 10			
Female	9	56.3%	5	38.5%
Male	7	43.8%	8	61.5%
Degree of hearing loss (Better Ear)				
Within normal limits ^a	1	6.3%	0	0.0%
Mild	0	0.0%	2	15.4 %
Moderate	7	43.8%	1	7.7%
Severe	2	12.5%	4	30.8 %
Profound	6	37.5%	6	46.2%
Age at diagnosis				
< 6 months	15	93.8%	11	84.6%
> 6 months	1	6.3%	2	15.4%
Age at FCEI enrolment				
< 6 months	13	81.3%	7	53.8%
> 6 months	3	18.8%	6	46.2%
Duration of FCEI enrolment				
< 12 months	6	37.5%	5	38.5%
> 12months	10	62.5%	8	61.5%
Device type				
No device	1	86.3%	0	0.0%
Hearing aids only (1 or 2)	8	50.0%	3	23.1%
Cochlear implant (+/-HA)	7	43.8%	10	76.9%

Table 1Child Participant Characteristics by Group

Note. HA = Hearing aid

^aOne child had profound unilateral hearing loss in one ear and hearing within normal limits in the other ear.

groups (i.e., telepractice or in-person) for child participants and practitioner participants. For caregiver participants, one statistically significant difference was noted for socioeconomic status as measured by the Index of Relative Socio-economic Advantage and Disadvantage (IRSAD) (p < .001) with a larger proportion of families in the telepractice group living in less advantaged areas and a larger proportion of families in the in-person group living in more advantaged areas. No other differences were found for the caregiver participants. It is important to note, however, that some cell sizes were too small to meet the necessary statistical assumptions, and the significance may represent a Type 1 error rather than a true effect.

Instrumentation

Interactions between caregivers, children, and practitioners were analyzed using

Table 2

Caregiver Participant Characteristics by Group

	т		TT 1	
Caregiver characteristics"	In-pers	on	Telepra	ctice
<i>N</i> = 27	<i>n</i> = 15		<i>n</i> = 12	
Caregiver gender				
Female	14	93.3%	11	91.7%
Male	1	6.7%	1	8.3%
Maternal level of education				
12 years or less of formal schooling	0	0.0%	1	8.3%
Advanced diploma or certificate	3	20.0%	4	33.3%
University degree	12	80.0%	7	58.3%
Maternal employment status				
Employed outside of the home	10	66.7%	8	66.7%
Caring for family full-time	5	33.3%	4	33.3%
Index of Relative Socio-economic				
Advantage and Disadvantage (IRSAD)				
Quintile 1	0	0.0%	3	25.0%
Quintile 2	2	13.3%	4	33.3%
Quintile 3	2	13.3%	5	41.7%
Quintile 4	2	13.3%	0	0.0%
Quintile 5	9	60.0%	0	0.0%

Note. IRSAD quintiles range from most disadvantaged (Quintile 1) to most advantaged (Quintile 5)

^aTwo caregivers had multiple children participating in the study.

Table 3Practitioner Participant Characteristics by Group

			-	
In-j	In-person		Telepractice	
<i>n</i> =	: 11	n =	6	
7	63.6%	4	66.7%	
4	36.4%	2	33.3%	
4	36.4%	0	0.0%	
7	63.6%	6	100.0%	
Years of experience				
3	27.3%	1	16.7%	
8	72.7%	5	83.3%	
	In-j n = 7 4 4 7 3 8	In-person $n = 11$ 7 63.6% 4 36.4% 4 36.4% 7 63.6% 3 27.3% 8 72.7%	In-personTel $n = 11$ $n =$ 763.6%4436.4%2436.4%0763.6%6327.3%1872.7%5	In-person $n = 11$ Telepractice $n = 6$ 763.6%4436.4%2336.4%000.0%763.6%6116.7%872.7%5833.3%

^aThree practitioners in each group participated with multiple families in the study.

the Triadic Intervention Evaluation Rating Scale (TIERS) (Basu et al., 2010). This instrument was selected because it focuses on the individual behaviors of both the practitioner and the caregiver relative to the principles of FCEI as well as the interactions between the participants' behaviors. The TIERS consists of 33 items that

assess patterns of participant interactions during family-centered early intervention sessions (Basu et al., 2010). The scale allows raters to simultaneously measure 21 practitioner behaviors and 12 caregiver behaviors within the context of a routine activity segment involving practitioner, caregiver, and child (Basu et al., 2010). Each item is rated according to the proportion of behaviors observed relative to the number of available opportunities, using a 4-point scale ranging from 0 (*No opportunity*) to 3 (*Almost always*). All items begin with the common stem, "When there was an opportunity, did the practitioner/caregiver...?".

The 21 practitioner behaviors included in the TIERS represent various strategies that support caregiver involvement including the use of help-giving practices, observation, coaching, teaching, and modelling (Basu, 2007; Basu et al., 2010). The 12 caregiver behaviors reflect different ways that caregivers can participate in an early intervention session to promote child engagement in activities (Basu, 2007; Basu et al., 2010) including behaviors that correspond to the six responsive behaviors identified by Raab et al., (2013).

The scales have been reported to have good content validity and high internal consistency ($\alpha = .94$ for the practitioner scale and $\alpha = .91$ for the caregiver scale) (Basu et al., 2010). Although practitioner and caregiver behaviors are rated independently on the TIERS, the original validation study also considered the reciprocal nature of the practitioner-caregiver partnership and the way in which each participant's behaviors potentially influenced, and was influenced by, the other participant's behaviors (Basu, 2007).

The TIERS (Basu, 2007) clusters practitioner behaviors into two interactional "styles" (i.e., directive and supportive) and two "purposes" (i.e., teaching and involving). Each behavior can be categorized by a combination of style and purpose,

resulting in four possible sets of behaviors as shown in Figure 1. According to Basu (2007) directive behaviors include active practitioner strategies such as modelling a behavior or explaining teaching a specific skill. Supportive behaviors include more passive behaviors such as waiting, observing and active listening. The TIERS includes 12 directive behaviors and 9 supportive behaviors. Either interaction style can be used for the purpose of teaching or involving. Teaching behaviors described by Basu (2007)

	 Directive-Involving Maintain non-interfering position Arrange environment Create opportunities for interaction Interact with dyad Engage dyad in relevant activities Engage dyad in multiple activities 	 Supportive-Involving Let caregiver decide Answer caregiver concerns Listen to caregiver Request caregiver input Ask caregiver questions
Teaching	 Directive-Teaching Share information about child's progress Explicitly teach caregiver a strategy Evaluate progress with caregiver Suggest ideas Connect skills to other routines 	 Supportive-Teaching Use and expand caregiver ideas Allow sufficient time for practice Observe and provide feedback Comment on strategies that are working well
	 Explain how embedding helps child's development Directive 	→ Supportive

"When there was an opportunity, did the practitioner..."

Figure 1. TIERS practitioner behaviors categorized according to purpose and style (adapted from Basu, 2007)
include 10 behaviors that provide new information and are intended to support caregiver learning whereas the 11 involving behaviors are those used to support caregiver participation and facilitate interactions between caregiver and child.

Caregiver behaviors on the TIERS are grouped into three levels: low, medium, high (Basu, 2007) as shown in Figure 2. Each level consists of four behaviors that describe caregiver participation with their child and the practitioner. Passive behaviors that do not require the caregiver to demonstrate understanding of intervention techniques are classified as *low-participation* whereas behaviors that actively influence the child's actions and require the caregiver to have knowledge of intervention strategies and goals are classified as *high-participation* (Basu, 2007). Active behaviors that influence the child's engagement but do not require the caregiver to possess additional intervention skills are classified as *medium-participation* (Basu, 2007).

"When there was an opportunity, did the caregiver ...?"

Figure 2. TIERS caregiver behaviors categorized according to participation level (adapted from Basu, 2007)

Data Sampling Strategy

Each of the 29 triads (practitioner, caregiver, and child), consented to the video

recording of four regularly occurring early intervention sessions during a 10-week

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period. This design increased the likelihood of capturing a representative set of data and served several practical purposes. First, the extended collection period allowed for the possibility of some sessions being either cancelled due to the unavoidable absence of participants, or unusable because of recording issues. Second, capturing multiple sessions provided triads with flexibility to decline video recording of a specific session. Finally, video recording on multiple occasions increased participant familiarity with the technology and reduced the potential for participants to alter their behavior as a result of being recorded (usually referred to as a Hawthorne effect). This was particularly important for in-person triads who did not routinely have their sessions recorded.

For telepractice triads, sessions were recorded using existing recording capability within the videoconferencing platform. This was a normal procedure for this mode of service delivery where video recording occurred frequently for the purpose of later sharing and discussion with families. For recordings related to this research project however, caregiver and child consent to record was reconfirmed at the beginning of each session. If consent was not provided, the recording was discontinued. To ensure consistency in the quality of recording and audio/video clarity, in-person sessions were recorded using the same videoconferencing equipment as the telepractice sessions. This was achieved by conducting in-person sessions in a specific teaching room that included videoconferencing equipment. The teaching room was set up in a typical manner for the participants involved with videoconferencing equipment located unobtrusively on the wall or on a trolley in the corner of the room. If an in-person triad had not previously used the designated room, the practitioner was asked to conduct at least one session in the room prior to recording sessions. At the beginning of each session consent was reconfirmed with all participants and the equipment was set to record. The video monitor was turned off to minimize distraction.

Data Management. In total, 105 video recordings were collected (45 telepractice and 60 in-Person). All video files were examined by the first author to ensure the integrity of audio and video integrity. Once validated, the video file was deidentified, assigned an alphanumeric code, and transferred to a secure server for further coding and analysis. Using methods outlined by Basu et al. (2010) all video files were reviewed in full by the first author to identify activity segments (i.e., discrete sections of the video record in which all three members of the triad participate in a specific activity with a clearly defined beginning and end point). Once identified, the first author categorized each activity segment according to 1 of 16 routine types described in the Family-Guided Routines-Based Intervention model (fgrbi.com, see Figure 3).

Play Routines	Literacy	Caregiver	Community and
	Activities	Routines	Family Routines
 Play with Objects Social Games Pretend Play Physical Play 	 Songs and Rhymes Writing/Drawing Reading and Literacy Computer, TV, Video 	•Food-Related •Dressing-Related •Comfort, Care, & Safety •Hygiene-Related	•Family Chores •Errands •Recreation •Socialization

Figure 3. Family routine categories as defined by Family-Guided Routines Based Intervention (adapted from FGBRI.com)

Activity segments for all triads were catalogued in a spreadsheet including the routine category, segment start and end times, and overall segment duration. In order to reduce the likelihood of any observed differences in behaviors being a function of differing routine types, the video catalogue was analyzed to identify routine categories that were common for all participants. Following the method used by Basu et al. (2010), the average segment length was calculated for each of these segment types. For each triad, the segment that was closest to that average time was selected for analysis.

From the catalogue of 105 videos, 581 individual activity segments were identified. The most commonly occurring routine categories were Playing with Objects (n = 148), Social Games (n = 103), Reading with Books (n = 82) and Pretend Play (n = 74). There was no routine type that was common to all 29 triads, however, there were commonalities within age groupings. All 13 triads with a child participant under 3 years of age demonstrated at least one Playing with Objects (POC) segment (M = 6.9, range: 3-13). Of the 16 triads with a child participant over 3 years of age, 15 demonstrated at least one Social Games (SOG) segment (M=3.6, range: 1-10). One triad in the over 3 group was excluded because they did not demonstrate an SOG segment. The average POC segment length for the under 3 group was 6 minutes 35 seconds (range: 3 min 11 s - 9 min 48 s) and the average SOG segment length for the over 3 group was 8 minutes 56 seconds (range: 7 min 14 s - 15 min 25 s). For each triad under 3 years of age, the POC segment closest to the average POC segment length for the group was selected and for the triads over 3 years the SOG segment closest to the average SOG segment length for the group was selected and for the triads over 3 years the SOG segment closest to the average SOG segment length for the group was selected and for the triads over 3 years the SOG segment closest to the average SOG segment length for the group was selected and for the triads over 3 years the SOG segment closest to the average SOG segment length for the group was selected.

Rater Training and Reliability

Once the segments for analysis were identified, 20 segments were selected from the remaining video recordings for use in rater training and reliability trials. The first author served as the primary rater and a second rater was identified for the purposes of ensuring reliability of coding. The second rater was an expert practitioner in the field of early intervention, deafness, and telepractice, but had no affiliation with the research project.

As part of training, the second rater reviewed the TIERS instrument and the associated information (Basu et al., 2010). The two raters then met to discuss the scoring procedures, and undertake training as follows. An initial video segment was

viewed twice and scored jointly by the two raters on each occasion—first for practitioner behaviors and then for caregiver behaviors. Discrepancies in scoring were discussed to refine definitions of behaviors and establish consistent scoring guidelines. All decisions were documented to assist future scoring. A second training segment was scored independently, before comparing ratings, discussing discrepancies, and documenting the rationale for each decision. This process was continued in a second training session with the raters each independently scoring two additional training segments. On completion of training, both raters independently viewed and scored four additional training video segments to confirm reliability. Reliability on caregiver behaviors was high with 88% exact agreement, but the ratings of practitioner behaviors were less consistent. Raters scored within one point of each other on 95% of practitioner items, but exact agreement occurred for only 58% of ratings.

Two changes were made to the original scoring scale to ensure more accurate and reliable coding of practitioner behaviors (see Table 4). First, the two categories of *no opportunity* and *never observed* were collapsed into one category. Second, the *sometimes* category was split into two categories to create an additional scoring level. The modified scoring guidelines, including definitions and key indicators for each behavior, were reviewed by both raters and any ambiguities were clarified. Both raters scored four training segments to confirm reliability with the new scale with 73% exact agreement. In order to ensure the highest possible integrity of rating for the segments sampled for analysis, a consensus method of score determination was adopted for the purposes of this research. Each rater scored all video segments independently, then met to discuss scores and reach consensus on any disagreements. Even though independent agreement was high for the caregiver ratings, this consensus method of rating was applied to both the practitioner and caregiver behaviors for uniformity.

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Table 4Original and Modified Practitioner Rating Scales for TIERS practitioner behaviors

	Original TIERS scale		Revised TIERS scale	
0	No Opportunity \rightarrow		No Opportunity/Never =	
1	Never = \rightarrow not observed	1	not observed	
2	Sometimes =	2	Rarely = observed once	
	at least once	3	Sometimes = observed a few times	
3	Almost Always = \rightarrow more than half the session	4	Almost Always = observed frequently	

Analysis

For each triad, scores were recorded for each of the 21 practitioner behaviors and the 12 caregiver behaviors. Both raters used the modified scoring scale described in Table 4 to assign a rating from 1-4 for each practitioner on each behavior. For each caregiver, both raters used the original scoring scale to record a rating of 0-3 for each behavior. As noted previously, a consensus method was applied to determine scores for all 33 practitioner and caregiver behaviors. Final consensus scores were collated and imported to IBM SPSS Statistics for Windows, Version 24.0 for analysis. Mean scores were calculated for each of the 33 behaviors and exact Chi-square tests were used to determine whether there was any difference between the telepractice and in-person groups on individual behaviors. Kendall's tau-b correlation coefficient was used to test for associations between practitioner behaviors and caregiver behaviors. Practitioner behaviors were grouped by purpose and interaction style (i.e., as per Figure 1) and caregiver behaviors by level of participation (i.e., as per Figure 2). Chi-square (exact) tests were used to determine whether there were any differences between the telepractice and in-person groups regarding practitioner purpose and style, and caregiver level of participation.

Results

Practitioner Behaviors

The consensus approach to scoring involved both raters independently scoring all 28 video segments. For practitioner behaviors, exact agreement between raters was reached for 52% of the items. For the remaining 48%, the two raters determined an agreed rating through collaborative reference to the scoring guidelines.

What family-centered strategies do practitioners use when early intervention sessions are delivered through telepractice and in-person and do these strategies differ between delivery modes? In order to answer the first research question, exact Chi-square tests were conducted for each of the 21 practitioner behaviors. Results indicated a significant difference between the telepractice and inperson groups for four behaviors: (a) Comment on specific strategies that are working well, (b) Let caregivers make decisions about what to do in a session, (c) Use and expand caregiver ideas during the session, and (d) Connect skills being learned in current routines to other routines. The first three behaviors were used more frequently by practitioners in telepractice. The fourth behavior—Connect skills being learned in current routines to other routines—was used more frequently by practitioners in-person. Table 5 shows relative proportions of ratings for use of each behavior by delivery mode and the related *p* values for the exact Chi-square tests.

Overall, the behavior used most frequently by practitioners was "Allow sufficient time for the caregiver to practice strategies" and the behavior used least frequently was "Ask questions about routines, use of strategies, or the child's actions at

Percentage in each category Practitioner Never Rarely Some-Almost Behavior Mode times always n p* 12.5 37.5 in-person 25.0 25.0 Allow sufficient time 16 .17 for caregiver practice telepractice 8.3 0.0 16.7 75.0 12 Observe interactions in-person 6.3 43.8 12.5 37.5 16 .93 and provide feedback telepractice 0.0 33.3 16.7 50.0 12 0.0 43.8 31.3 25.0 in-person 16 Listen to caregiver .28 telepractice 0.0 12 25.0 16.7 58.3 Engage dyad in in-person 6.3 31.3 37.5 25.016 .59 multiple activities telepractice 8.3 25.0 16.7 50.0 12 Arrange environment in-person 0.0 37.5 37.5 25.0 16 .56 to support dyad 12 telepractice 0.0 16.7 41.7 41.7 Engage dyad in in-person 0.0 37.5 43.8 18.8 16 .22 relevant activities telepractice 0.0 16.7 33.3 50.0 12 Share information 12.5 in-person 37.5 18.8 31.3 16 .83 about child's progress 33.3 12 telepractice 25.0 8.3 33.3 Explicitly teach a 12.5 25.0 in-person 12.5 50.0 16 .46 strategy to caregiver telepractice 33.3 25.0 33.3 12 8.3 **Evaluate** progress 31.3 37.5 18.8 12.5 in-person 16 .25 with caregiver telepractice 25.0 33.3 0.0 41.7 12 18.8 56.3 25.0 0.0 16 in-person Let caregiver decide <.001 telepractice 0.0 8.3 33.3 58.3 12 Create opportunities 37.5 31.3 25.0 16 in-person 6.3 .17 for dyad interaction telepractice 0.0 8.3 66.7 25.0 12 Maintain non-0.0 37.5 43.8 18.8 16 in-person .32 interfering position telepractice 0.0 8.3 58.3 33.3 12 0.0 37.5 50.0 in-person 12.5 16 .69 Interact with dyad telepractice 0.0 41.7 33.3 25.0 12 Comment on strategies in-person 50.0 43.8 0.0 6.3 16 .05 that are working well telepractice 12 50.0 8.3 8.3 33.3 Connect skills to in-person 37.5 31.3 0.0 31.3 16 .04 other routines telepractice 12 50.0 25.0 25.0 0.0 Use and expand in-person 25.0 50.0 25.0 0.0 16 .02

caregiver ideas

Suggest new ideas

Answer caregiver

concerns

telepractice

telepractice

telepractice

in-person

in-person

8.3

31.3

33.3

56.3

75.0

16.7 43.8

25.0

18.8

16.7

Table 5Percentage of Ratings in Each Category for TIERS Practitioner Behaviors

(continued)

.76

.79

12

16

12

16

12

33.3

12.5

16.7

6.3

0.0

41.7

12.5

25.0

18.8

8.3

Request caregiver input on session	in-person telepractice	68.8 50.0	18.8 41.7	0.0 8.3	12.5 0.0	16 12	.24
Explain how embedding helps child's development	in-person telepractice	81.3 75.0	0.0 16.7	12.5 8.3	6.3 0.0	16 12	.37
Ask caregiver questions about routines	in-person telepractice	81.3 91.7	18.8 8.3	0.0 0.0	0.0 0.0	16 12	.61

Note. n represents total number of triads in each mode. Significance levels of $p \le .05$ are shown in boldface.

*Exact Chi-square test used to determine significance

Table 6

Percentage of Practitioners Receiving an Almost Always Rating for Each TIERS Practitioner Behavior

	Percentage of Almost Always ratings				
Practitioner behavior	Total (N=28)	In-person (n=16)	Telepractice (n=12)		
Allow sufficient time for caregiver practice	53.6	37.5	75.0		
Observe interactions and provide feedback	42.9	37.5	50.0		
Listen to caregiver	39.3	25.0	58.3		
Engage dyad in multiple activities	35.7	25.0	50.0		
Arrange environment to support dyad	32.1	25.0	41.7		
Engage dyad in relevant activities	32.1	18.8	50.0		
Share information about child's progress	32.1	31.3	33.3		
Explicitly teach a strategy to caregiver	28.6	25.0	33.3		
Evaluate progress with caregiver	25.0	12.5	41.7		
Let caregiver decide	25.0	0.0	58.3		
Create opportunities for dyad interaction	25.0	25.0	25.0		
Maintain a non-interfering position	25.0	18.8	33.3		
Interact with dyad	17.9	12.5	25.0		
Comment on strategies that are working well	17.9	6.3	33.3		
Connect skills to other routines	17.9	31.3	0.0		
Use and expand caregiver ideas	17.9	0.0	41.7		
Suggest new ideas	17.9	12.5	25.0		
Answer caregiver concerns	14.3	18.8	8.3		
Request parent input on session	7.1	12.5	0.0		
Explain how embedding helps child's development	3.6	6.3	0.0		
Ask caregiver questions about routines	0.0	0.0	0.0		

(continued)

home". Table 6 shows the percentage of practitioners in each group who received a rating of *almost always* for each behavior. Notably, for the in-person group, the largest percentage of practitioners who received an *almost always* rating was 38% and related to only two behaviors. The comparable percentage of 38% was met or exceeded by practitioners in the telepractice group in relation to nine behaviors.

When behaviors were categorized by intended purpose (i.e., teaching or involving), there were significant differences between the telepractice and in-person groups for both *teaching* behaviors (p = .032) and *involving* behaviors (p = .004). Practitioners in telepractice used both *teaching* and *involving* behaviors more frequently than practitioners in-person as shown in Table 7.

Table 7

Percentage of Ratings for Each Practitioner Behavior by Purpose in Telepractice and In-Person Groups

		Percentage in each category					
			Almost				
PURPOSE	Mode	Never	Rarely	Sometimes	always	Total	p*
	in-person	21.6	34.1	27.8	16.5	176	
Involving	telepractice	20.5	19.7	28.0	31.8	132	.004
Taashing	in-person	30.0	32.5	17.5	20.0	160	032
Teaching	telepractice	30.8	20.0	15.8	33.3	120	.032

Note. Totals represent number of triads in each mode by the number of possible behaviors for each purpose

*Exact Chi-square test used to determine significance

When behaviors were clustered according to interaction style (i.e., directive or supportive), Chi-square (exact) tests showed a significant difference between the telepractice and in-person groups for *supportive* behaviors. On average, practitioners in telepractice used *supportive* behaviors more frequently than practitioners in-person (p = <.001). No significant difference was found for *directive* behaviors (see Table 8).

Table 8

Percentage of Ratings for Each Practitioner	r Behavior by Interaction Style in
Telepractice and In-Person Groups	

		Pe	ercentage				
INTERACTION					Almost		
STYLE	Mode	Never	Rarely	Sometimes	always	Total	p*
	in-person	18.2	31.8	29.7	20.3	192	
Directive	telepractice	20.8	21.5	27.8	29.9	144	.09
Supportivo	in-person	35.4	35.4	13.9	15.3	144	< 001
Supportive	telepractice	31.5	17.6	14.8	36.1	108	< .001

Note. Totals represent number of triads in each mode by the number of possible behaviors for each interaction style

*Exact Chi-square test used to determine significance

Caregiver Behaviors

After independently scoring all 28 video segments, exact agreement for caregiver behaviors was 85%. For consistency, raters adopted the same consensus approach to caregiver behaviors as with practitioner behaviors. Agreement on the remaining 15% of items was reached through collaboration.

What participation behaviors do caregivers demonstrate when early intervention sessions are delivered through telepractice and in-person and do these behaviors differ between deliver modes? Analysis of the results for the 12 caregiver behaviors using exact Chi-square tests indicated a significant difference between the telepractice and in-person groups for four behaviors. In each case, caregivers in the telepractice group were judged to have used the behavior more frequently than those in the inperson group (see Table 9).

Overall, however, caregivers in the in-person group had fewer opportunities to demonstrate participation behaviors when compared with those using telepractice. Only 19% of in-person caregivers had an opportunity to demonstrate all 12 behaviors compared to 83% of telepractice caregivers. This discrepancy was most notable for high participation behaviors—particularly "Choose or initiate activities"—with 81% of in-

Caregiver Mode No Never Some- Almost	
U	
Behavior opportunity times always n	p*
Pay attention toin-person0.00.06.393.816	1 00
session activities telepractice 0.0 0.0 8.3 91.7 12	1.00
Show a warm and in-person 0.0 0.0 18.8 81.3 16	24
positive affect telepractice 0.0 0.0 0.0 100.0 12	.24
Remain at child's eye- in-person 0.0 0.0 12.5 87.5 16	1 00
level telepractice 0.0 0.0 8.3 91.7 12	1.00
Promote access to in-person 0.0 6.3 18.8 75.0 16	
materials telepractice 0.0 0.5 18.8 75.0 10	.24
Increase opportunities in-person 0.0 6.3 18.8 75.0 16	.24
for child to participate telepractice 0.0 0.0 0.0 100.0 12	
Provide verbal in-person 0.0 0.0 31.3 68.8 16	05
encouragement telepractice 0.0 0.0 0.0 100.0 12	.05
Join child in what they in-person 0.0 0.0 31.3 68.8 16	05
are doing telepractice 0.0 0.0 0.0 100.0 12	.05
Encourage child by in name $(2, 0, 0, 25, 0, 0, 25, 0, 0, 25, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,$	
taking part tolerrootice 8.2 0.0 25.0 08.8 10	.14
$\frac{1}{12}$	
Expand on child's in-person 0.0 6.3 31.3 62.5 16	02
response telepractice 0.0 0.0 0.0 100.0 12	.05
Taka an activa rolo in the second sec	
Take an active fole in $\frac{1}{10}$ -person 0.0 0.0 37.5 62.5 16	.18
activities. telepractice 0.0 0.0 8.3 91.7 12	
Share relevant in-person 12.5 6.3 31.3 50.0 16	21
information telepractice 16.7 8.3 0.0 75.0 12	.21
Choose or initiate in-person 81.3 0.0 12.5 6.3 16	
activities telepractice 8.3 0.0 0.0 91.7 12 <	.001

Table 9Percentage of Ratings in Each Category for TIERS Caregiver Behaviors

Note. n represents total number of triads in each mode. Significance levels of $p \le .05$ are shown in boldface.

* Exact Chi-square test used to determine significance

person caregivers receiving a *no opportunity* rating on that item compared to only 8% of telepractice caregivers.

For the in-person group, this behavior received the fewest almost always ratings

(6.3%). The three participation behaviors most frequently demonstrated by in-person

caregivers were: (a) "Pay attention to session activities", (b) "Show a warm and positive

affect", and (c) "Remain at the child's eye level". All three behaviors are categorized as low-participation behaviors using the classification system devised by Basu (2007). Table 10 shows the percentage of *almost always* ratings for each caregiver behavior in rank order from most used to least used. Notably, for the telepractice group, a rating of *almost always* was demonstrated by 100% of the group in relation to six participation behaviors; two low, two medium, and two high.

Table 10

Percentage of Caregivers Receiving an Almost Always Rating for each TIERS Caregiver Behavior

	Percentage of Almost Always						
		ratings					
	Participation	Total	In-person	Telepractice			
Caregiver Behavior	Level	(N=28)	(n=16)	(n=12)			
Pay attention to session activities.	LOW	92.9	93.8	91.7			
Show a warm and positive affect	LOW	89.3	81.3	100.0			
Remain at child's eye-level	LOW	89.3	87.5	91.7			
Promote access to materials.	MED	85.7	75.0	100.0			
Increase opportunities for child to participate.	HIGH	85.7	75.0	100.0			
Provide verbal encouragement for child.	LOW	82.1	68.8	100.0			
Join child in what they are doing	MED	82.1	68.8	100.0			
Encourage the child by taking part in session	MED	78.6	68.8	91.7			
Expand on child's actions with an additional response.	HIGH	78.6	62.5	100.0			
Take an active role in activities.	MED	75.0	62.5	91.7			
Share relevant information	HIGH	60.7	50.0	75.0			
Choose or initiate activities	HIGH	42.9	6.3	91.7			

When behaviors were grouped by participation level, Chi-square (exact) tests showed significant differences in caregivers' use of high- (p < .001), medium- (p < .001)

.001) and low-participation (p = .04) behaviors. As reported in Table 11, caregivers in the telepractice group more frequently demonstrated behaviors at all three participation levels than caregivers in the in-person group.

Table 11

Percentage of Ratings for Each Caregiver Behavior by Participation Level in Telepractice and In-Person Groups

		Percent	Percentage in each category					
Participation		No		Some-	Almost			
Level	Mode	opportunity	Never	times	always	Total	p*	
	in-person	23.4	4.7	23.4	48.4	64.0	<.001	
High	telepractice	6.3	2.1	0.0	91.7	48.0		
N / 1'	in-person	1.6	1.6	28.1	68.8	64.0	<.001	
Medium	telepractice	2.1	0.0	2.1	95.8	48.0		
Low	in-person	0.0	0.0	17.2	82.8	64.0	.039	
	telepractice	0.0	0.0	4.2	95.8	48.0		

Note. Totals represent number of triads in each mode by the number of possible behaviors for each level of participation.

* Exact Chi-square test used to determine significance

Relationships between Practitioner and Caregiver Behaviors

Does the use of specific strategies by practitioners affect caregivers' participation behaviors when early intervention sessions are delivered through telepractice and in-person and does this relationship vary between delivery modes? To address this question, Kendall's tau-b (τ b) correlations were calculated to examine relationships between the 21 practitioner and the 12 caregiver behaviors. The results show strong positive correlations between 10 practitioner behaviors and 8 caregiver behaviors (see Tables 12-15). A total of 31 results met the criteria for a for a medium or greater effect size (i.e., τ b \geq 0.50). Notably, all correlations of 0.50 or greater were also statistically significant at the 0.01 level.

	Directive-Teaching Practitioner Behaviors							
Caregiver Participation Behaviors	Share progress information	Explicitly teach strategy	Evaluate with caregiver	Suggest new ideas	Connect skills to routines	Explain embedding		
High	momuton	shutegy	eurogivei	ideus	Toutines			
Choose or initiate	06	.03	.14	.21	11	.08		
Share	.15	.05	.14	.01	.02	.24		
Expand on child's actions	33	22	14	02	31	.03		
Increase child's opportunities to participate	16	02	05	01	09	.20		
Medium								
Encourage by taking turn	.16	.30	.08	.18	.00	.25		
Take an active role	19	.01	04	.15	23	.06		
Promote access to materials	16	16	05	01	22	.20		
Join in with child	23	01	05	.19	22	.23		
Low								
Remain at eye level	.19	.01	.13	03	.06	15		
Provide verbal encouragement	23	13	05	.08	22	.23		
Show warm and positive affect	03	02	08	16	08	.17		
Pay attention to activities	.14	.18	.07	.16	.11	.14		

Kendall's tau-b correlation coefficients for the relationships between Directive-Teaching Practitioner Behaviors and Each TIERS Caregiver Behavior

Note. Correlation coefficients \geq .50 are shown in boldface.

Table 12

Table 13

Kendall's tau-b Correlation Coefficients for the Relationships Between Directive-
Involving Practitioner Behaviors and Each TIERS Caregiver Behavior

	Directive-Involving Practitioner Behaviors					
Caregiver Participation Behaviors	Non- interfering position	Arrange environment	Create Oppor- tunities	Interact with dyad	Relevant Activities	Multiple Activities
High Choose or initiate	.57	.39	.40	.26	.54	.35
Share information	.09	.01	.08	18	.30	11
Expand on child's actions	.36	.32	.46	.22	.35	.34
Increase child's opportunities to participate	.41	.25	.42	.19	.39	.30
Medium Encourage by taking turn	.68	.54	.63	.55	.63	.53
Take an active role	.55	.52	.62	.50	.52	.53
Promote access to materials	.26	.39	.36	.19	.25	.30
Join in with child	.50	.47	.60	.50	.47	.51
Low						
Remain at eye level	.00	.16	.12	09	.01	01
Provide verbal encouragement	.38	.36	.48	.27	.36	.36
Show warm and positive affect	.31	.29	.27	.08	.03	.22
Pay attention to activities	.37	.35	.33	.30	.35	.27

Note. Correlation coefficients \geq .50 are shown in boldface.

In terms of the supportive-teaching behaviors, one was significantly positively correlated with three caregiver behaviors and one was significantly positively correlated with six caregiver behaviors. The other two supportive-teaching behaviors were not significantly correlated with any caregiver behaviors (see Table 14). Finally, of the five supportive-involving behaviors one was significantly positively correlated with three caregiver behaviors and another was significantly positively correlated with one caregiver behavior (see Table 15).

Table 14

Kendall's tau-b Correlation Coefficients for the Relationships Between Supportive-Teaching Practitioner Behaviors and Each TIERS Caregiver Behavior

	Supportive-Teaching Practitioner Behaviors			
Caregiver	Expand	Provide	Observe	Comment on
Participation	caregiver	sufficient	and provide	useful
Behaviors	Ideas	practice	feedback	strategies
High				
Choose or initiate	.64	.51	.04	.14
Share information	.18	.15	16	27
Expand on child's actions	.56	.46	.01	.00
Increase child's opportunities to participate	.46	.50	.10	05
Medium				
Encourage by taking turn	.37	.69	.16	.24
Take an active role	.49	.61	01	.17
Promote access to materials	.46	.44	01	20
Join in with child	.47	.62	.08	.02
Low				
Remain at eye level	.04	01	.08	.31
Provide verbal encouragement	.55	.56	.08	11
Show warm and positive affect	.37	.37	01	18
Pay attention to activities	.13	.38	.00	.05

Note. Correlation coefficients \geq .50 are shown in boldface.

Table 15

Kendall's tau-b Correlation Coefficients for the Relationships Between Supportive	?-
Involving Practitioner Behaviors and Each TIERS Caregiver Behavior	

	Supportive-Involving Practitioner Behaviors				
Caregiver Participation Behaviors	Let caregiver decide	Answer caregiver concerns	Listen to caregiver	Request caregiver input	Ask caregiver about routines
High					
Choose or initiate	.82	16	.33	.13	07
Share information	.16	.35	.50	.32	05
Expand on child's actions	.43	38	06	34	26
Increase child's opportunities to participate	.28	14	.13	30	11
Medium					
Encourage by taking turn	.50	.04	.33	09	02
Take an active role	.54	29	.03	27	24
Promote access to materials	.28	10	.00	39	11
Join in with child	.48	23	.02	44	08
Low					
Remain at eye level	.12	03	.14	.26	19
Provide verbal encouragement	.38	23	.02	44	08
Show warm and positive affect	.12	.06	.14	23	19
Pay attention to activities	.20	.19	.16	03	.11

Note. Correlation coefficients \geq .50 are shown in boldface.

When viewed from the perspective of the caregivers' level of participation, all four high-participation behaviors were significantly positively correlated with practitioner behaviors. The high-participation behavior "Choose or initiate activities" was significantly correlated with five practitioner behaviors and each of the other three high-participation behaviors was correlated with a single different practitioner behavior. One medium-participation behavior ("Promote access to materials") was not correlated with any practitioner behaviors. The other three medium-participation behaviors were each significantly positively correlated with five or more practitioner behaviors. Finally, one of the four low-participation behaviors ("Provide verbal encouragement") was positively correlated with two practitioner behaviors. The other three low-participation behaviors were not significantly correlated with any practitioner behaviors.

For six of the twelve caregiver participation behaviors, all caregivers in the telepractice group received an *almost always* rating (see Table 10). As a consequence, the data did not meet the statistical assumptions necessary to calculate correlations between each group (i.e., telepractice and in-person). Therefore, it was not possible to definitively answer the question as to whether these relationships differed by delivery mode.

Discussion

Regardless of delivery mode, practitioners in this study used a range of strategies to involve caregivers and, when given the opportunity, caregivers actively participated in sessions. This indicates that practitioners' use of strategies was not limited by engagement in telepractice and that practitioners in that setting were able to use a range of family-centered practices to support caregiver involvement.

Although practitioners in both settings used a range of strategies to support caregiver involvement in sessions, they did not use these strategies with the same degree of frequency. In telepractice, practitioners used three supportive behaviors more frequently ("Comment on specific strategies", "Let caregivers decide", and "Use and expand caregiver ideas") than practitioners in-person. Practitioners in-person used one directive behavior ("Connect skills to other routines") more frequently than practitioners in telepractice. It is possible that the physical distance created by telepractice encourages practitioners to engage more collaboratively with caregivers and necessitates the use of coaching strategies that support greater caregiver engagement. Practitioners' use of more supportive behaviors may motivate caregivers to demonstrate greater levels of participation.

Caregivers in both settings were engaged in the sessions, but the type and frequency of participation behaviors varied between settings. In telepractice, caregivers more frequently demonstrated participation behaviors at all three levels—low, medium, high—compared to caregivers in-person. In addition, caregivers in the telepractice group had more opportunities to demonstrate high-participation behaviors than caregivers in the in-person group. Specifically, caregivers in the telepractice group had more opportunities to choose or initiate activities in the session. This increased level of caregiver participation may be related to the inability of the practitioner to physically interact with the child during a telepractice session and the practitioner's increased reliance on the caregiver as the child's primary communication partner. Such an increase may suggest higher levels of caregiver self-efficacy, which is a positive and anticipated outcome of FCEI that leads to improved developmental outcomes for the child.

Basu (2010) found that caregivers were more likely to engage in highparticipation behaviors when practitioners used more supportive behaviors. In this study, practitioners in telepractice used supportive behaviors more frequently than practitioners in-person, and caregivers in telepractice more frequently demonstrated high-participation behaviors than caregivers in-person. In particular, there was a strong positive correlation between the practitioner behavior "Let caregivers decide" and the caregiver behavior "Choose or initiate activities" ($\tau b = .82$) This suggests that telepractice may facilitate practitioners' use of specific strategies which, in turn,

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encourages caregivers to engage in more active, high-participation behaviors. This study builds on the findings of Behl et al. (2017) who reported that practitioners in telepractice were more responsive to families and caregivers in telepractice demonstrated stronger levels of engagement in intervention. It is likely that the physical distance introduced by telepractice compels practitioners to reconsider the way in which they interact with families during FCEI sessions, and to shift from a practitioner-led framework to one that relies more firmly on family-centered practices. Moreover, the results of the present study suggest that a telepractice setting may serve to increase practitioners' use of capacity-building practices and provide more opportunities for caregivers to take an active role in leading the FCEI session.

Limitations and Future Research Directions

It is noted that the TIERS rating scale used in this study was originally designed to measure practitioner and caregiver behaviors within an in-person early intervention setting for children under 5 years of age. In the present study, the instrument was used to evaluate a group of participants receiving early intervention in-person but was applied also to those engaged in through telepractice. In addition, five of the 28 child participants in this study were older than 5 years of age (M = 5:8). These variations from standard administration notwithstanding, it is apparent that the 33 behaviors sampled by the TIERS reflect best practice principles in FCEI that are just as pertinent and important in telepractice as in-person settings and are certainly still applicable to FCEI sessions involving slightly older children (i.e., 5-7 years old).

The TIERS was designed and validated as part of a research project investigating the triadic nature of FCEI. Despite its relevance as a strategy for investigating the issues under consideration in this study, the instrument has not been used widely in the field of early intervention. In this study, the TIERS was practical and clinically useful for evaluating behaviors, but, as noted previously, the scoring procedures for the practitioner scale were modified to ensure higher reliability of the ratings assigned using the instrument. These adjustments were applied to both groups (i.e., telepractice and in-person) and additional strategies were employed to ensure that ratings consistent with those procedures were obtained for both groups. Broader use of the instrument would contribute data about the reliability and validity of the instrument, and additional research examining the existing scoring procedures is warranted.

This study used an intact sample derived from a group of families who had participated in a previous study. Mode of service delivery was defined by program enrolment and, since all families had been enrolled in a program for at least two months, random assignment to the telepractice and in-person conditions was not possible. In this sample, pre-existing enrolment conditions meant it was not possible to differentiate between modality (i.e., telepractice and in-person) and location (i.e., in-home or incenter). In order to substantiate the findings from the present study it would be valuable to replicate the design using random selection of the various permutations of location (i.e., in-home or in-center) and delivery mode (i.e., telepractice or in-person). This approach would allow researchers to clearly delineate between the effects of location and modality, notwithstanding that, in practice, the vast majority of early intervention via telepractice is occurring in-home, as was the case in the current study.

The total number of practitioners included in the present study (N = 17) was similar to other studies addressing these issues (Behl [N = 15]; Blaiser [N = 9]). However, the practitioner participants in those studies provided services in both telepractice and in-person settings, whereas those in the present study provided services exclusively through telepractice (n = 6) or in-person (n = 11). This delineation increased the likelihood that the design of the present study would target the intended variable

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(i.e., mode of delivery) and that any ensuing findings could be attributed to mode of service delivery. Given the small number of participants in the present study, it was not possible to match practitioners on characteristics such as professional discipline or qualifications. It would strengthen the findings reported here to replicate this study with a larger cohort, with matched groups of practitioners.

Conclusion

This study sought to investigate the impact of service delivery mode (i.e., telepractice or in-person) on observed practitioner and caregiver behaviors in FCEI for children who are DHH. Practitioners in both groups used a wide range of practices to support caregiver self-efficacy and involvement, and caregivers in both groups demonstrated active participation in FCEI sessions. These findings support the view that early intervention services can be provided through telepractice in a manner that is (a) consistent with the principles of FCEI, and (b) maintains a level of family-centeredness that is like services provided in-person. Furthermore, practitioners in the telepractice group used supportive behaviors more frequently than practitioners in the in-person group. In parallel, caregivers in the telepractice group demonstrated more highparticipation behaviors than those in the in-person group. These findings suggest that early intervention services provided through telepractice may serve to enhance practitioners' use of specific family-centered practices, which, in turn, supports higher levels of caregiver participation. Contrary to raising concerns about any limitations of using telepractice to deliver FCEI for children who are D/HH, these findings point to outcomes of the use of this delivery mode that are potentially positive and desirable.

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5.3 Considering patterns of triadic interaction

As noted in Article 4, the TIERS was designed to evaluate four aspects of early intervention sessions: (a) practitioner behaviours, (b) caregiver behaviours, (c) participant roles, and (d) the relationships between participants (Basu 2010). Practitioner and caregiver behaviours were discussed in Article 4. The remaining two aspects (i.e., participant roles and relationships) address Research Question 7—*What roles do participants in the early intervention sessions (i.e., practitioners, caregivers, and children) fulfill in early intervention sessions for children who are DHH and does this differ when services are delivered in telepractice or in-person*?—and Research Question 8—*What relationships are formed within practitioner/ caregiver/child triads and do these relationships differ when services are delivered in telepractice or inperson*? These final two questions are addressed in this section.

5.3.1 Additional data analysis

The two raters identified in Article 4 reviewed the same data samples described in Article 4, and independently coded participant roles and relationships for each triad using the same approach to consensus decision making as was used previously. Where disagreement occurred on role assignment or relationship rankings, the ratings were discussed until the raters reached consensus. Participant roles were delineated into four categories: Actor, Active Observer, Passive Observer, and Non-participant. Each member of the triad (practitioner, caregiver, and child) received one of these four role designations based on the role most frequently assumed during the observed session. The categories were not exclusive, which meant it was possible for more than one member of the triad to perform the same role. See Table 5.1 for definitions of each role.

Based on the triadic nature of FCEI sessions, relationships were classified in four possible configurations: *Caregiver-Child, Practitioner-Child, Practitioner-*

Role	Definition
ACTOR	Person who actively, interacts with other members of the triad
ACTIVE OBSERVER	Person who observes and responds to other members of the triad (e.g., comments, suggests, writes notes, or offers feedback)
PASSIVE OBSERVER	Person who observes without interacting directly with other members of the triad (e.g., watches, nods, does not initiate)
NON- PARTICIPANT	Person who is distracted (on phone, interacting with others outside of session, physically distant, etc.) or does not attend to/focus on any of the session activities

Table 5.1Roles labels and descriptions as outlined by the TIERS

Caregiver, and *Practitioner-Dyad*. These four relationships can occur with varying frequency throughout a session and the TIERS is designed to rank the relationships from most frequently occurring to least frequently occurring.

The final consensus ratings were collated and imported to IBM SPSS Statistics for Windows, Version 24.0 for analysis. Frequency of occurrence was calculated for each possible role for practitioners and caregivers and exact Chi-square tests were used to evaluate the similarity of the two groups (i.e., telepractice or in-person). Because rankings of the 4 possible relationships within each subject were identified by the raters, the rank transformation approach advocated by Conover and Iman (1981) was used to compare ranks by applying repeated measures analysis of variances (ANOVA) with 1 between subjects factor (mode of service delivery) and 1 within subjects factor (relationship type) to determine if the pattern of mean ranks between relationships differed between mode of service delivery (i.e., telepractice and in-person).

5.3.2 Results

To address Research Question 7—*What roles do participants (i.e., practitioners, caregivers, and children) fulfill in early intervention sessions for children who are DHH*

and does this differ when services are delivered in telepractice or in-person?—the two raters assigned a role to each participant (i.e., practitioners, caregivers, and children). Exact agreement between the raters was 75% with regard to the practitioner role and 79% with regard to the caregiver role. Agreement on the remaining practitioner and caregiver roles was reached using the consensus method outlined previously. All children assumed an actor role regardless of intervention mode so no further analysis was conducted on child role. Exact Chi-square tests were conducted to compare the two groups (i.e., telepractice and in-person) for each of the possible roles and a significant difference was identified between the two practitioner groups (i.e., telepractice and inperson) regarding roles (p < .001). Practitioners in the in-person group took on an *Actor* role in 100% of the video segments, whereas practitioners in the telepractice group took on an *Actor* role in only 33% of the video segments. For the remaining 66% of segments, practitioners in the telepractice group engaged in an *Observer* role (see Figure 5.1).



Figure 5.1. Percentage of each type of practitioner role for in-person and telepractice groups

With regard to caregiver role, 83.3% of caregivers in the telepractice group assumed an *Actor* role. The caregivers in the in-person group were equally split between *Actor* and *Observer* roles. Exact Chi-square results showed no significant differences between the telepractice and in-person groups for caregiver role (p = .069).



Figure 5.2. Percentage of each type of caregiver role for in-person and telepractice groups

In order to answer the Research Question 8—*What relationships are formed within practitioner/caregiver/child triads and do these relationships differ when services are delivered in telepractice or in-person?*— the two raters independently reviewed video recordings for each triad and ranked the four possible relationships (*Caregiver-Child, Practitioner-Child, Practitioner-Caregiver*, and *Practitioner-Dyad*) from 1 to 4 with 1 being the most frequently observed and 4 being the least frequently observed. Using the consensus method, raters compared rankings for each triad and reached agreement through discussion. Mean ranks were plotted for each of the four relationships by delivery mode as shown in Figure 5.3. Mauchly's test indicated that the assumption of sphericity had been met ($\chi^2(5) = 3.85$, p = .57). Repeated measures ANOVA indicated that delivery mode had a significant effect overall on relationship rank (Wilk's lambda 0.511, F(3, 24) = 7.67, p = .001). For the in-person group, the most observed relationship was *Practitioner-Child* (M=1.50). In the telepractice group, the most observed relationship was *Caregiver-Child* (M=1.33).



Type of Service Delivery

Figure 5.3. Mean ranks and 95% confidence intervals for each relationship by mode of service delivery

5.3.3 Discussion

Practitioners in the telepractice group more frequently adopted an observer role than an actor role whereas the reverse was true for practitioners in the in-person group. Observation is a useful coaching strategy that practitioners employ along with feedback to enhance caregivers' confidence and competence within the early intervention session. This finding suggests that a telepractice setting may enhance the practitioners' ability to use observation more frequently. This is consistent with findings from Stredler-Brown (2017) that showed practitioners in telepractice sessions used the strategy of observation more frequently than in-person practitioners.

Although there was no significant difference between the two groups regarding the caregiver's role, the relationships among participants revealed a different pattern. The most frequently occurring relationship in the telepractice group was Caregiver-*Child*, suggesting that the telepractice setting may offer more opportunities for direct interactions between caregiver and child rather than practitioner-led interactions with the child. This supports the findings of Blaiser (2013) and Behl (2017) who both found that parents who participated in telepractice sessions were more engaged than those who received services in-person. For the in-person group, the most frequently occurring relationship was *Practitioner-Child*, suggesting that practitioners working in-person interact directly with the child more often than facilitating caregiver-child interactions or coaching the caregiver. Although supporting the caregiver-child dyad is a critical element of FCEI, neither the telepractice group nor the in-person group prioritised the *Practitioner-Dyad* relationship. This is clearly an issue to be addressed regardless of setting. The emphasis on child-focused relationships (e.g., Practitioner-Child or *Caregiver-Child*) could be reflective of practitioners' professional background or training, or individual caregivers' personalities, preferences, or learning styles and further research is warranted in this area.

5.4 Chapter summary and conclusion

This chapter explored the nature of triadic interaction and the potential ways in which practitioner and caregiver behaviours influence one another and the nature of the resulting roles and relationships that arise within FCEI sessions. In answer to Research

Question 4 about practitioners' use of family-centred practices, the article presented in this chapter demonstrated that practitioners in a telepractice setting were able to use a range of family-centred behaviours to effectively support caregiver involvement, and that the type and frequency of strategies used was not negatively affected by the telepractice setting. Indeed, practitioners in telepractice use three supportive behaviours more often than practitioners in-person. The article also addressed Research Question 5 concerning caregivers' participation levels by demonstrating that caregivers' participation was not restricted in the telepractice setting. On the contrary, caregivers in telepractice were provided with more opportunities to demonstrate high-participation behaviours and did so more frequently than caregivers in-person, particularly with regard to "Choose or initiate activities". Regarding the associations between practitioners' and caregivers' behaviours (Research Question 6) the study found 31 strong positive correlations ($\tau b \ge 0.50$) between 10 practitioner behaviours and 8 caregiver behaviours (Tables 13-16). Notably, none of the directive-teaching practitioner behaviours were correlated with any of the caregiver behaviours. Of the 31 correlations, the majority related to three of the four medium-participation caregiver behaviours. These three caregiver behaviours were strongly correlated with eight practitioner behaviours—all six directive-involving behaviours, one supportiveinvolving behaviour and one supportive-teaching behaviour. All four high-participation caregiver behaviours were correlated with at least one practitioner behaviour. Only one low-participation behaviour was correlated with any practitioner behaviours. Although further research is required to explore the causality of these relationships, these findings suggest that practitioners' use of specific family-centred behaviours, particularly directive-involving behaviours, can support caregivers' active participation in FCEI, including high levels of engagement with their child.

In answer to Research Question 7 regarding participants' roles, all the practitioners in the in-person setting fulfilled an *Actor* role during the observed FCEI session. In contrast, one-third of practitioners in telepractice adopted an *Actor* role. When a practitioner takes on the *Actor* role, the focus of the session typically shifts from being family-centred to being practitioner-led. In an *Observer* role, the practitioner is more likely to engage in coaching strategies such as commenting on strategies that are working well, providing feedback about caregiver-child interactions, connecting the child's actions to their goals, and allowing sufficient time for the caregiver to practice. Interestingly, 83% of caregivers in the telepractice group engaged in an *Actor* role compared to 50% of caregivers in the in-person group. This finding may suggest that when the practitioner adopts an *Observer* role, the caregiver is more likely to take on an *Actor* role. Further research is required to explore this possibility in a systematic manner.

The final element of triadic interactions investigated here relates to Research Question 8—the nature of relationships formed among participants. For the in-person group, the most frequently observed relationship was *Practitioner-Child*, which indicates that the practitioners interacted directly with the child rather than the caregiver or caregiver-child dyad. The predominance of the *Practitioner-Child* relationship in this group corresponds to the finding that practitioners in-person consistently adopted the *Actor* role. These two conditions emphasise the use of practitioner-led intervention strategies, including teaching the child directly. In contrast, the most frequently observed relationship in the telepractice group was *Caregiver-Child*, which demonstrates that caregivers in telepractice interacted directly with their child more often than caregivers in-person. This is consistent with the finding that most caregivers in telepractice took on an *Actor* role. Both findings highlight the caregivers' active involvement in telepractice sessions, which is a key outcome of FCEI.

Finally, practitioners in the telepractice group used more family-centred practices more frequently than practitioners in-person. Likewise, caregivers in telepractice demonstrated more *high-participation* behaviours more frequently than caregivers in-person. It is also apparent that, regarding roles and relationships, practitioners in telepractice engaged in observation more frequently, whereas caregivers in telepractice participated more actively in sessions than their in-person counterparts. These findings suggest that telepractice leads to a greater use of family-centred practices and increased caregiver involvement, both of which are positive and desirable in the context of FCEI.

CHAPTER 6: DISCUSSION

6.1 Introduction

The final chapter in this thesis provides an overview of the key findings of the research as well as commentary on the strengths and limitations of the studies. The significance of the research, implications for practice, and recommendations for future research are also discussed.

6.2 Key findings

In the first of the empirical studies presented in this thesis, practitioners' selfassessment of their use of family-centred practices did not differ significantly between telepractice and in-person service delivery. Practitioners in both groups (i.e., telepractice and in-person) reported the use of a wide range of family-centred practices and both groups reported using those practices to a similarly high degree. These self-report findings were subsequently substantiated in part by observational data that suggested practitioners in both groups did, in fact, use a range of strategies to support caregiver engagement in early intervention. However, regarding degree of use of those strategies, there were two notable differences. First, practitioners in telepractice used two supportive-teaching behaviours (i.e., "Comment on specific strategies" and "Use and expand caregiver ideas") and one supportive-involving behaviour (i.e., "Let caregivers decide") more frequently than practitioners in-person. Second, practitioners in-person used one directive-teaching behaviour (i.e., "Connect skills being learned in current routine to other routines"), more frequently than those in telepractice.

Regarding caregivers' assessment of their self-efficacy and involvement, caregivers in both groups (i.e., telepractice and in-person) reported similar levels of selfefficacy and involvement. Like the practitioner participants, caregivers' assessments of their self-efficacy in supporting their child's acquisition of language were partially substantiated by observational data. Caregivers in both groups were actively engaged in early intervention sessions, but there were significant differences between groups regarding the type and frequency of behaviours that were demonstrated. Caregivers in telepractice demonstrated participation behaviours at all three levels—low, medium, high—more frequently than caregivers in-person. In addition, caregivers in telepractice had more opportunities to demonstrate the high-participation behaviour "Choose or initiate activities", which was positively correlated with the supportive practitioner behaviour "Let caregiver make decisions"—a behaviour more frequently demonstrated by practitioners in telepractice. Of the 31 positive correlations between caregivers' and practitioners' behaviours this association showed the highest significant positive correlation (τ b = .82, *p* < .001).

Another key finding pertained to the roles adopted by practitioners and caregivers within the context of FCEI sessions. In 100% of the observed sessions, practitioners in-person typically engaged in an *Actor* role whereas practitioners in telepractice most frequently engaged in an *Observer* role. This difference was statistically significant (p < .001) and suggests that practitioners in-person take the lead during FCEI sessions rather than supporting the caregiver to take charge of the session. Notably, these results are substantiated by findings related to the individual items on the TIERS. That analysis showed that practitioners in-person used one directive behaviour (i.e., "Connect skills being learned in current routine to other routines") more frequently whereas practitioners in telepractice used three supportive behaviours (i.e., "Comment on specific strategies", "Use and expand caregiver ideas", and "Let caregivers decide") more frequently. Furthermore, that role distinction was reflected in the relationships formed among participants (practitioners, caregivers, and children) with the

Practitioner-Child relationship occurring most frequently for the in-person group, and the *Caregiver-Child* relationship occurring most frequently in the telepractice group.

6.3 Significance of the research

The use of family-centred practices is generally accepted as best practice in early intervention for children who are DHH because of the positive associations with caregiver self-efficacy and involvement and, ultimately, with child and family outcomes (Dunst et al., 2019; JCIH, 2013, 2019; Moeller et al. 2013). With the advent of telepractice, new research was warranted to confirm whether the use of family-centred practices and the associated positive outcomes can be maintained when FCEI is delivered through telepractice. This thesis sought to contribute new evidence on practitioners' use of family-centred practices and caregivers' self-efficacy and involvement in their children's early development when FCEI is provided through telepractice.

Practitioners and caregivers in this study reported that FCEI delivered through telepractice provided a level of family-centredness that was equivalent to the levels reported by practitioners and caregivers who participated in FCEI in-person. These results support the view that services provided through telepractice can provide a suitable alternative to the provision of FCEI in-person. Most notably, the results show that practitioners who are experienced in FCEI can maintain the use of family-centred practices and promote caregiver self-efficacy and involvement within the context of telepractice.

Analysis of the observed behaviours of practitioners in early intervention also clearly indicated that they can, and do, use family centred practices effectively in the context of telepractice delivery of those services. Indeed, practitioners in the telepractice group used *supportive* behaviours more frequently than practitioners in-person, and provided more opportunities for caregivers to participate in sessions. They also took on an *Observer* role more often than an *Actor* role. Correspondingly, caregivers in telepractice demonstrated greater levels of participation and engaged more frequently in *Caregiver-Child* interactions than caregivers in-person. These results reinforce the anecdotal findings reported in the literature that suggest services provided through telepractice promote greater caregiver engagement resulting in sessions that are more family-centred than those provided in-person.

The early intervention programs that participated in this investigation were committed to the use of FCEI and provided ongoing professional development in the use of specific family-centred practices. This philosophy was evident in the degree of family-centredness reported and observed across the studies in this investigation. Nevertheless, despite the philosophical similarities, the practitioners in the telepractice group used family-centred practices more frequently than the in-person group. This suggests that the telepractice mode of delivery might enhance practitioners' use of family-centred practices if they already possess a commitment to, and proficiency in, FCEI. The importance of professional development in the delivery of FCEI, and more specifically, the delivery of FCEI through telepractice, should not be overlooked when considering these results.

This investigation used existing instruments to examine various elements of FCEI when services were provided through telepractice. The purpose and content of each instrument—MPOC-SP, SPISE, and TIERS—was relevant and applicable to the telepractice setting, even though all three instruments were designed originally for inperson services. The results obtained from these instruments, which are reported in detail throughout this thesis, were consistent with research findings from other studies examining in-person service delivery. This degree of alignment should provide
confidence to other researchers who are considering the use of these instruments to evaluate FCEI within a telepractice setting.

6.4 Strengths, Limitations, and Future Research

6.4.1 Study Design

The program of research reported in this thesis comprised a series of studies that included self-assessment and observational data for a single group of participants. The use of direct observation to confirm the self-assessments reported by participants increases the validity of the conclusions drawn here. Notwithstanding this strength, the results reported in this thesis derive from data collected at one point in time. Future research might consider the collection of data at multiple points over time to enhance the reliability of the data collected and examine any variability that might occur in participants' behaviours as a result of skill development over time.

The collection of data from practitioners and caregivers in this study enabled comparison of service delivery from the perspectives of both the service providers and the service recipients. The focus on practitioners' and caregivers' behaviours, rather than child outcomes, was based on research that has demonstrated positive associations variously between family-centred practices, caregiver engagement, and child outcomes when early intervention is provided in-person (Dunst et al., 2019). The intent of this thesis was to determine whether the first two components (i.e., family-centred practices and caregiver engagement) were maintained in a telepractice setting with the expectation that, if they were, positive child outcomes would follow, consistent with the in-person research. It is acknowledged that such assumptions warrant testing, and it would be useful for future researchers to consider the child outcomes resulting from FCEI delivered through telepractice. Indeed, research that specifically considers the communication and language outcomes that are achieved as a result of FCEI provided through telepractice would be particularly relevant for children who are DHH.

The sample size in this study was large compared to other studies reported in the literature (e.g., Behl et al., 2013; Blaiser et al., 2017; A.S. Brown, 2015; Havenga et al., 2017), but was not sizeable enough to allow matching of participants. It would strengthen the findings reported here to replicate the investigation with a larger cohort comprising matched groups of practitioners, caregivers, and children. Further, it is noted that this investigation used an intact sample within one organisation, which addressed many of the limitations identified in previous studies (Behl et al., 2013; Blaiser et al., 2017; A.S. Brown, 2015; Havenga et al., 2017). However, the participants in this investigation were pre-assigned to either the telepractice or in-person group based on their employment or enrolment in a particular early intervention program. Future research with a larger cohort would enable random assignment to the telepractice or in-person condition thereby removing some of the potential confounds associated with self-selection.

The practitioners in this study represented a highly educated and experienced group with regular access to professional development on the topic of FCEI. In addition, the telepractice group received specific training in the use of telepractice to provide FCEI. These circumstances may have created a uniquely qualified group of practitioners who are not representative of the general population of practitioners providing FCEI to children who are DHH. Research has shown that additional training using specific methodologies can enhance practitioners' use of family-centred practices (Dunst, 2015). Future research investigating training and professional development in the areas of FCEI and telepractice, both independently and jointly, and the impact of those factors on practitioners' use of family-centred practices as well as child and family outcomes would make a useful contribution to the literature.

6.4.2 Instruments

The instruments used in this investigation had several strengths and limitations. All three instruments (MPOC-SP, SPISE, and TIERS) addressed specific family-centred practices, but each was designed with a different focus. The MPOC-SP addresses relational and participatory help-giving practices, and has been used widely with children from birth to 17 years of age who have developmental delays and disabilities—a much broader cohort than the one studied in this investigation. In contrast, the SPISE and the TIERS both target participants in early childhood intervention for infants and young children. The TIERS measured practitioners' and caregivers' behaviours within the context of one FCEI session and evaluated the roles and relationships that occurred within that session. In addition to a narrow focus on FCEI, the SPISE specifically assessed the self-efficacy and involvement of caregivers of caregivers of children who are DHH. Both the TIERS and the SPISE have been validated within a research setting, but neither has been used widely in the field. As a result, there was limited information about the practical application of either instrument.

In the absence of a published training manual for the TIERS, applying the rating scale to practitioner behaviours presented two challenges. First, the distinction between *No opportunity* and *Not observed* was not easily defined. Second, the distances between scores appeared unevenly distributed, particularly at the upper end of the scale. For the purpose of this study, the rating scale was modified as described in Chapter 3. It is acknowledged that this amendment limits the opportunity for comparison with studies where the TIERS was used, or might be used in the future, in its unamended form. Future research could usefully examine the scoring procedures to further define the

rating scales, with a view to formally publishing the instrument with a comprehensive examiner's manual.

The author of the SPISE provided additional insight and advice on its implementation within the context of this investigation (J. DesJardin, personal communication, May 5, 2016). This additional information provided continuity of application with the literature and allowed for comparison between this investigation and other published studies. Recently, the SPISE has been revised extensively (Ambrose et al., 2020) and it is noted, therefore, that future research might use the updated version to replicate the caregiver self-assessment study outlined in this thesis.

Overall, the instruments used in this investigation focused on assessment of participants' behaviours in early intervention, through both self-report and direct observation. For practitioners, the assessments provided a measure of their use of family-centred practices but did not allow for examination of their underlying beliefs about the use of FCEI. Similarly, the instruments used and the analyses undertaken regarding caregivers' participation behaviours did not provide for any investigation of caregivers' beliefs about their role in their child's early development. Use of a scale that measures practitioners' and caregivers' beliefs, or qualitative interviews to examine those beliefs would add depth to the current research literature.

Finally, having established significant differences between practitioners' and caregivers' behaviours in telepractice and in-person FCEI, it is apparent that it would be beneficial for future research to examine the underlying mechanisms that resulted in those differences. Research paradigms that further explore the relationships between participants' behaviours and mode of service delivery could provide insights into any inherent differences between telepractice and in-person FCEI. Specifically, researchers might seek to identify which elements of the telepractice context affect practitioners'

use of family-centred practices and how those practices are in-turn related to caregivers' levels of participation and involvement. For example, the lack of physical contact between practitioners and children during telepractice may affect practitioners' choice of coaching strategies and necessitate greater involvement by caregivers. Further, although the current evidence presented here shows a relationship between practitioners' and caregivers' behaviours, further research is required to determine the directionality of those relationships. For instance, a caregiver behaviour such as *Choose or initiate activities* might have occurred as a result of the practitioner behaviour *Let caregivers take charge* or, equally, the converse might be true.

New research paradigms could examine the ways in which practitioners' use of specific family-centred practices in telepractice and caregivers' participation in telepractice sessions influence each other. To that end, it might also be beneficial for researchers to seek to develop specific assessment instruments. It is noteworthy that all the instruments used in this investigation were designed to assess aspects of early intervention in the context of in-person service delivery. The use of those instruments was deemed appropriate in the current studies because the core principles of familycentred practice should be demonstrable in either mode of delivery. Nevertheless, it is worth noting that, for some instruments, there were elements of intervention in the telepractice mode that could perhaps have been more appropriately or easily assessed by an instrument designed, or adapted, specifically for that purpose. In the TIERS, for example, it may be that there are additional or alternative behaviours, such as practitioners' use of nonverbal feedback in telepractice, that should be added as indicators of good practice in that mode. Developing a means of identifying and evaluating such additional or alternative behaviours would enrich the assessment of telepractice service delivery in the future.

6.5 Conclusion

By removing the barriers associated with demography and geography, telepractice has created an environment where early intervention practitioners and families can live and work in their preferred locations, specialist practitioners can be centralised to increase opportunities for collegial support and professional development, and families can have greater access to practitioners whose skills and experience most closely match the specific needs of their children. Nevertheless, telepractice is still an evolving model of service delivery, and concerns have been raised about the limitations of using telepractice to deliver FCEI to children who are DHH, and their families. The investigations presented in this thesis provide evidence to the contrary, supporting the notion that practitioners can maintain the principles of FCEI, and that caregivers are able to actively participate in FCEI, when sessions are provided through telepractice. These findings were supported by both self-assessment and observations of the behaviours of practitioners and caregivers. Furthermore, the evidence presented in this thesis highlights some potential advantages of delivering FCEI through telepractice, namely, the ability to (a) deliver services directly into the home, (b) provide increased opportunities for practitioners to use family-centred practices such as observation and coaching, (c) promote greater caregiver involvement in early intervention sessions, and (d) enhance caregivers' confidence and competence in supporting the early learning and development of their child who is DHH. Overall, the evidence presented here supports the conclusion that telepractice can be used to provide early childhood intervention that is consistent with the principles of FCEI and achieves positive outcomes for children who are DHH and their families.

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APPENDIX A

STATEMENTS OF CONTRIBUTION BY CO-AUTHORS

Appendix A.1 – Article One (Chapter Two) Statement of Contribution

As co-authors of the article titled " Telepractice delivery of family-centred early intervention for children who are deaf or hard of hearing: A scoping review", we confirm that Melissa McCarthy made the following contributions:

- Conceptualisation of the article
- Primary development of:
 - a. research questions
 - b. research design and methodology
- Collection and compilation of all data
- Primary analysis of data
- Writing and revision of the manuscript
- Management of the publication processes including all correspondence with the journal editors and publisher

Melion la

Melissa McCarthy (01/09/2020)

Greg Leigh (01/09/2020)

au

Michael Arthur-Kelly (01/09/2020)

Endorsed by Assistant Dean (Research Training), Faculty of Education and Arts:

Manay Cushing

Nancy Cushing (02/09/2020)

Appendix A.2 – Article Two (Chapter Three) Statement of Contribution

As co-authors of the article titled "Practitioners' self-assessment of family-centred practice in telepractice versus in-person early intervention ", we confirm that Melissa McCarthy made the following contributions:

- Conceptualisation of the article
- Development and submission of applications for ethical approval (i.e., initial and any required amendments)
- Review and interpretations of the literature
- Primary development of:
 - a. research questions
 - b. research design and methodology
- Development of recruitment and data collection procedures and protocols
- Recruitment of all participants
- Collection and compilation of all data
- Cleaning and de-identification of data
- Primary analysis of data in collaboration with supervisors, with input from the statistical support service at the University of Newcastle
- Writing and revision of the manuscript
- Management of the publication processes including all correspondence with the journal editors and publisher

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Endorsed by Assistant Dean (Research Training), Faculty of Education and Arts:

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Appendix A.3 – Article Three (Chapter Four) Statement of Contribution

As co-authors of the article titled " Comparison of caregiver engagement in telepractice and in-person family-centered early Intervention ", we confirm that Melissa McCarthy made the following contributions:

- Conceptualisation of the article
- Development and submission of applications for ethical approval (i.e., initial and any required amendments)
- Review and interpretations of the literature
- Primary development of:
 - a. research questions
 - b. research design and methodology
- Development of recruitment and data collection procedures and protocols
- Recruitment of all participants
- Collection and compilation of all data
- Cleaning and de-identification of data
- Primary analysis of data in collaboration with supervisors, with input from the statistical support service at the University of Newcastle
- Writing and revision of the manuscript
- Management of the publication processes including all correspondence with the journal editors and publisher

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Appendix A.4 – Article Four (Chapter Five) Statement of Contribution

As co-authors of the article titled " Comparison of observed participant behaviors in telepractice and in-person early intervention ", we confirm that Melissa McCarthy made the following contributions:

- Conceptualisation of the article
- Development and submission of applications for ethical approval (i.e., initial and any required amendments)
- Review and interpretations of the literature
- Primary development of:
 - c. research questions
 - d. research design and methodology
- Development of recruitment and data collection procedures and protocols
- Recruitment of all participants
- Collection and compilation of all data
- Cleaning and de-identification of data
- Primary analysis of data in collaboration with supervisors, with input from the statistical support service at the University of Newcastle
- Writing and revision of the manuscript
- Management of the publication processes including all correspondence with the journal editors and publisher

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APPENDIX B

ETHICS DOCUMENTATION

Appendix B.1 – Human Research Ethics Committee Notification of Approval, 2015

HUMAN RESEARCH ETHICS COMMITTEE



Notification of Expedited Approval

To Chief Investigator or Project Supervisor.	Conjoint Professor Gregory Leigh	
Cc Co-investigators / Research Students:	Ms Melissa McCarthy Associate Professor Michael Arthur-Kelly	
Re Protocol:	Early intervention for children with hearing loss: a comparison of telepractice and in-person settings	
Date:	26-Aug-2015	
Reference No:	H-2015-0205	
Date of Initial Approval:	26-Aug-2015	
Re Protocol: Date: Reference No: Date of Initial Approval:	Associate Professor Michael Arthur-Kelly Early intervention for children with hearing loss: a comparison of telepractice and in-person settings 26-Aug-2015 H-2015-0205 26-Aug-2015	

Thank you for your **Response to Conditional Approval (minor amendments)** submission to the Human Research Ethics Committee (HREC) seeking approval in relation to the above protocol.

Your submission was considered under Expedited review by the Chair/Deputy Chair.

I am pleased to advise that the decision on your submission is Approved effective 26-Aug-2015.

In approving this protocol, the Human Research Ethics Committee (HREC) is of the opinion that the project complies with the provisions contained in the National Statement on Ethical Conduct in Human Research, 2007, and the requirements within this University relating to human research.

Approval will remain valid subject to the submission, and satisfactory assessment, of annual progress reports. If the approval of an External HREC has been "noted" the approval period is as determined by that HREC.

The full Committee will be asked to ratify this decision at its next scheduled meeting. A formal Certificate of Approval will be available upon request. Your approval number is H-2015-0205.

If the research requires the use of an Information Statement, ensure this number is inserted at the relevant point in the Complaints paragraph prior to distribution to potential participants You may then proceed with the research.

Conditions of Approval

This approval has been granted subject to you complying with the requirements for Monitoring of Progress, Reporting of Adverse Events, and Variations to the Approved Protocol as detailed below.

PLEASE NOTE:

In the case where the HREC has "noted" the approval of an External HREC, progress reports and reports of adverse events are to be submitted to the External HREC only. In the case of Variations to the approved protocol, or a Renewal of approval, you will apply to the External HREC for approval in the first instance and then Register that approval with the University's HREC.

Monitoring of Progress

Other than above, the University is obliged to monitor the progress of research projects involving human participants to ensure that they are conducted according to the protocol as approved by the HREC. A progress report is required on an annual basis. Continuation of your HREC approval for this project is conditional upon receipt, and satisfactory assessment, of annual progress reports. You will be advised when a report is due.

Reporting of Adverse Events

- 1. It is the responsibility of the person first named on this Approval Advice to report adverse events.
- Adverse events, however minor, must be recorded by the investigator as observed by the investigator or as volunteered by a participant in the research. Full details are to be documented, whether or not the investigator, or his/her deputies, consider the event to be related to the research substance or procedure.
- 3. Serious or unforeseen adverse events that occur during the research or within six (6) months of completion of the research, must be reported by the person first named on the Approval Advice to the (HREC) by way of the Adverse Event Report form (via RIMS at <u>https://rims.newcastle.edu.au/login.asp</u>) within 72 hours of the occurrence of the event or the investigator receiving advice of the event.
- 4. Serious adverse events are defined as:
 - · Causing death, life threatening or serious disability.
 - Causing or prolonging hospitalisation.
 - Overdoses, cancers, congenital abnormalities, tissue damage, whether or not they are judged to be caused by the investigational agent or procedure.
 - Causing psycho-social and/or financial harm. This covers everything from perceived invasion of privacy, breach of confidentiality, or the diminution of social reputation, to the creation of psychological fears and trauma
 - · Any other event which might affect the continued ethical acceptability of the project.
- 5. Reports of adverse events must include:
 - · Participant's study identification number
 - o date of birth;
 - date of entry into the study,
 - treatment arm (if applicable);
 - date of event;
 details of event;
 - the investigator's opinion as to whether the event is related to the research procedures; and
 - action taken in response to the event
- 6. Adverse events which do not fall within the definition of serious or unexpected, including those reported from other sites involved in the research, are to be reported in detail at the time of the annual progress report to the HREC.

· Variations to approved protocol

If you wish to change, or deviate from, the approved protocol, you will need to submit an Application for Variation to Approved Human Research (via RIMS at https://ms.newcastle.edu.au/login.asp). Variations may include, but are not limited to, changes or additions to investigators, study design, study population, number of participants, methods of recruitment, or participant information/consent documentation. Variations must be approved by the (HREC) before they are implemented except when Registering an approval of a variation from an external HREC which has been designated the lead HREC, in which case you may proceed as soon as you receive an acknowledgement of your Registration.

Linkage of ethics approval to a new Grant

HREC approvals cannot be assigned to a new grant or award (ie those that were not identified on the application for ethics approval) without confirmation of the approval from the Human Research Ethics Officer on behalf of the HREC.

Best wishes for a successful project. Professor Allyson Holbrook Chair, Human Research Ethics Committee

For communications and enquiries: Human Research Ethics Administration Research Services Research Integrity Unit The Chancellery The University of Newcastle Callaghan NSW 2308 T +61 2 492 17894 F +61 2 492 17164 Human-Ethics@newcastle.edu.au RIMS website - https://RIMS.newcastle.edu.au/login.asp

Appendix B.2 – Human Research Ethics Committee Variation Approval, 2016

HUMAN RESEARCH ETHICS COMMITTEE



Notification of Expedited Approval

To Chief Investigator or Project Supervisor: Cc Co-investigators / Research Students: Re Protocol: Date: Reference No:

Ms Melissa McCarthy Professor Michael Arthur-Kelly Early intervention for children with hearing loss: a comparison of telepractice and in-person settings 22-Aug-2016 H-2015-0205

Conjoint Professor Gregory Leigh

Thank you for your Response to Conditional Approval (minor amendments) submission to the Human Research Ethics Committee (HREC) seeking approval in relation to a variation to the above protocol.

Variation to

1. Implement a different approach to participant recruitment, as follows:

a. Moving from the single invitation to participate outlined in the original protocol to a two-stage approach with separate invitations for each phase (survey and video recording of sessions)

b. Moving from combined documentation for both phases to separate documentation for each of the two phases.

c. Aftering the invitation distribution process so that potential participants are provided with an invitation to participate, participant information statement, consent form and access to the survey at the same point in time

d. Send out invitations via email and track whether invitation is opened/accessed. For those with no record of being opened/accessed a hard copy invitation package will be sent with a follow-up phone call.

2. Add a final question to the survey asking whether participants agree to be contacted about the 2nd stage of the research.

3. Record a change in the professional status of the student researcher from 'Director of Educational Services' to 'Research Fellow'

- Practitioner Invitation Email (v2, August 2016)
- Caregiver Invitation Email (v 2, August 2016)
- Information Statement for Practitioner Survey (v5, dated 25/05/2016)
- Consent Form for Practitioner Survey (v4, dated 28/03/2016)
- Information Statement for Practitioner Video (v5, dated 25/05/2016)
 Consent Form for Practitioner Video (v5, dated 25/05/2016)
- Information Statement for Primary Caregiver Survey (v5, dated 25/05/2016)
- Consent Form for Primary Caregiver Survey (v4, dated 28/03/2016)
- Information Statement for Primary Caregiver Video (v5, dated 25/05/2016)
- Consent Form for Primary Caregiver Video (v5, dated 25/05/2016)
- Recruitment Flyer (submitted 16/08/2016)

Your submission was considered under Expedited review by the Ethics Administrator.

I am pleased to advise that the decision on your submission is Approved effective 22-Aug-2016. The full Committee will be asked to ratify this decision at its next scheduled meeting. A formal Certificate of Approval will be available upon request.

Professor Allyson Holbrook

Chair, Human Research Ethics Committee

For communications and enquiries: Human Research Ethics Administration

Research Services Research Integrity Unit NIER, Block C The University of Newcastle Callaghan NSW 2308 T +61 2 492 17894 Human-Ethics@newcastle.edu.au

Appendix B.3 – Human Research Ethics Committee Variation Approval, 2017

HUMAN RESEARCH ETHICS COMMITTEE



Notification of Expedited Approval

To Chief Investigator or Project Supervisor:	Conjoint Professor Gregory Leigh
Cc Co-investigators / Research Students:	Ms Melissa McCarthy Professor Michael Arthur-Kelly
Re Protocol:	Early intervention for children with hearing loss: a comparison of telepractice and in-person settings
Date:	09-Jun-2017
Reference No:	H-2015-0205

Thank you for your Variation submission to the Human Research Ethics Committee (HREC) seeking approval in relation to a variation to the above protocol.

Variation to expand Inclusion criteria to include a wider range of potential participants, as follows:

 AGE Current criteria states: is younger than six years of age Proposed criteria: is between birth and eight years of age and receives intervention sessions from RIDBC at least monthly

2. HOME LANGUAGE

Current criteria: uses spoken English as the primary language of the home AND uses spoken English as the primary language of early intervention sessions Proposed criteria: Reference to language of the home will be removed and inclusion will be based solely on the use of spoken English as the primary language of the early intervention sessions

3. DEGREE OF HEARING LOSS

Current criteria states: has a diagnosed permanent bilateral hearing loss of greater than 40 decibels as determined by the Australian Government's "Better Start for Children with Disability" Guidelines Proposed criteria: has a diagnosed hearing loss that qualifies the child for enrolment in an RIDBC early intervention program

- Information Statement for Primary Caregivers (v 6, dated 07/04/2017)

- Information Statement for Practitioners (v6, dated 07/04/2017)

Your submission was considered under Expedited review by the Chair/Deputy Chair.

I am pleased to advise that the decision on your submission is Approved effective 09-Jun-2017.

The full Committee will be asked to ratify this decision at its next scheduled meeting. A formal Certificate of Approval will be available upon request.

Associate Professor Helen Warren-Forward Chair, Human Research Ethics Committee

For communications and enquiries: Human Research Ethics Administration

Research & Innovation Services Research Integrity Unit NIER, Block C The University of Newcastle Callaghan NSW 2308 T +61 2 492 17894 Human-Ethics@newcastle.edu.au

RIMS website - https://RIMS.newcastle.edu.au/login.asp

Appendix B.4 – Recruitment Flyer

RIDBC Renwick Centre

EARLY INTERVENTION SURVEY

Your opinion matters!

As a valued member of the RIDBC community, you are invited to complete a brief survey about your early intervention experiences at RIDBC.

Your unique insights will contribute new evidence to the established standards for high quality services for children with hearing loss, and their families.

RIDBC relies upon research to ensure that our early intervention programs are continuously improved. Based on the best evidence available, we seek to achieve great outcomes for children with hearing loss and their families.

All families enrolled in ELP (HI) and RIDBC Teleschool (HI) are encouraged to participate. RIDBC professionals who support these families are also invited to participate.

Your involvement in this important research project is highly valued. Your contribution will help define future best practices in the fields of early intervention and education for children with hearing loss.

Typically, the survey takes less than 15 minutes to complete.

If you are interested in participating and/or would like further information, please contact Melissa McCarthy or Greg Leigh.

melissa.mccarthy@uon.edu.au or (02) 9872 0240

greg.leigh@ridbc.org.au or (02) 9872 0372

Greg Leigh, AO,PhD, FACE Conjoint Professor and Director RIDBC Renwick Centre

Complaints about this research

This project has been approved by the University's Human Research Ethics Committee, Approval No. H-2015-0205. Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to the researcher, or, if an independent person is preferred, to the Human Research Ethics Officer, Research Office, The Chancellery, The University of Human-



Appendix B.5 – Participant Information Statement for Practitioners: Study 1



Campus: 361-365 North Rocks Road North Rocks NSW 2151 Australia

Postal Address: Private Bag 29 Parramatta NSW 2124 Australia

Telephone +61 2 9872 0372 Facsimile +61 2 9872 0824

Email: Mellissa.mccarthy@uon.edu.au Greg.leigh@ridbc.org.au

Information Statement for Practitioners for the Research Project: Early intervention for children with hearing loss: a comparison of telepractice and in-person settings Document Version [5]; dated [25/05/2016]

You are invited to participate in the research project *Early intervention for children with hearing loss: a comparison of telepractice and in-person settings.* Melissa McCarthy, PhD Candidate at the University of Newcastle, Professor Greg Leigh, Director of RIDBC Renwick Centre and Professor Michael Arthur-Kelly of the University of Newcastle are conducting this research as part of Ms. McCarthy's studies in the Doctor of Philosophy (Education) program at the University of Newcastle, supervised by Professor Greg Leigh and Professor Michael Arthur-Kelly.

Why is the research being done?

Previous research has shown that specific early intervention practices lead to better outcomes for children and families. The purpose of the research is to gather input from parents and professionals regarding the use of those practices in RIDBC early intervention programs for children who are deaf or hard of hearing and their families. The findings of this study will have value for children who are deaf or hard of hearing and their families, the professionals who work with them, services providers and policy-makers at RIDBC and in the wider field of early intervention. Your assistance would be greatly appreciated.

Who can participate in the research?

All RIDBC practitioners who provide early intervention services to children who are deaf or hard of hearing and their families are invited to participate.

What would you be asked to do?

If you agree to participate, you will be asked to complete a questionnaire about your experiences with RIDBC early Intervention sessions.

The researchers will also require information about your experience and qualifications. You can provide this information either by completing the demographic section of the questionnaire or, with your consent, Mellssa McCarthy (student researcher) can access this information, and only this information, through existing RIDBC records.

What choice do you have?

Participation in this research is entirely your choice. Only those people who give their informed consent will be included in the project. Whether or not you decide to participate, your decision will not disadvantage you or the children/families with whom you work.

If you do decide to participate, you may withdraw from the project at any time without giving a reason and have the option of withdrawing any data which identifies you.

How much time will it take?

The questionnaire will take approximately 15 minutes to complete.

What are the risks and benefits of participating?

There are no anticipated risks associated with participating in this research. Your survey responses will be combined with responses from other professionals to form a group overview of the use of specific practices in RIDBC early intervention programs.

How will your privacy be protected?

Any information collected by the researchers which might identify you will be stored securely and only accessed by the researchers unless you consent otherwise, except as required by law. To ensure confidentiality, names will be replaced by numerical identifier codes on written documents (with the exception of consent forms). Personal information about participants will not be disclosed without their prior consent.





RIDBC Renwick Centre is administered by T he Royal Institute for Deaf and Blind Children in affiliation with the University of Newcastle, Australia (CRICGS Provider Number) 00109J) Physical data (printed questionnaires and consent forms) will be stored in a locked filing cabinet at the RIDBC Renwick Centre. Data will be retained for a minimum of 5 years as per University of Newcastle requirements.

Individual participants will not be named or identified in any reports or publications arising from the project.

How will the information collected be used?

The data collected will contribute towards a thesis to be submitted for Ms. McCarthy's Doctor of Philosophy degree and will be presented in academic publications and conferences. Individual participants will not be named or identified in any reports arising from the project.

Non-identifiable data may be also be shared with other parties to encourage scientific scrutiny, and to contribute to further research and public knowledge, or as required by law.

A summary of the aggregated results will be available to participants in the form of a report following publication. If requested, a summary of your individual data will be provided to you.

What do you need to do to participate?

Please read this Information Statement and be sure you understand its contents before you consent to participate. If there is anything you do not understand, or you have questions, please contact the researchers.

If you would like to participate, please complete the attached Consent Form and questionnaire. Both forms can be returned to Melissa McCarthy by postal mail in the enclosed pre-paid envelope (Melissa McCarthy, c/o RIDBC, Private Bag 29, Parramatta NSW 2124).

Further information

If you would like further information please contact Melissa McCarthy (<u>melissa.mccarthy@uon.edu.au</u> or 9872 0240) or Greg Leigh (<u>greg.leigh@ridbc.org.au</u> or 9872 0372)

Thank you for considering this invitation.

Professor Greg Leigh Chief Investigator

Melissa McCarthy Student Researcher

MAK

Professor Michael Arthur-Kelly Co-Investigator

Complaints about this research

This project has been approved by the University's Human Research Ethics Committee, Approval No. H-2015-0205

Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to the researcher, or, if an independent person is preferred, to the Human Research Ethics Officer, Research Office, The Chancellery, The University of Newcastle, University Drive, Callaghan NSW 2308, Australia, telephone (02) 49216333, email Human-Ethics@newcastle.edu.au.



RIDBC Renwick Centre is administered by T he Royal Institute for Deaf and Blind Children in affiliation with the University of Newcastle, Australia (CRICOS Provider Number: 00109J)

Appendix B.6 – Consent form for Practitioners: Study 1



Campus: 361-365 North Rocks Road North Rocks NSW 2151 Australia

Postal Address: Private Bag 29 Parramenta NSW 2124 Australia

Telephone +61 2 9872 0372 Facsimile +61 2 9872 0824

Email: mellissa.mccarthy@uon.edu.au GregJeigh@ridbc.org.au

Practitioner Consent Form for the Research Project Early intervention for children with hearing loss: a comparison of telepractice and inperson settings Professor Greg Leigh, Professor Michael Arthur-Kelly, Ms. Melissa McCarthy

Document Version [4]; dated [28/02/2016]

I agree to participate in the above research project and give my consent freely. I understand that I am not obligated to participate and my decision to participate/not participate will have no impact on my employment.

I understand that the project will be conducted as described in the Information Statement, a copy of which I have retained.

I understand I can withdraw from the project at any time and do not have to give any reason for withdrawing.

I consent to:

Royal Institute for Deaf and Blind Calibren

- completing a brief questionnaire;
- Melissa McCarthy, Student Researcher, accessing RIDBC files for the specific purpose of collecting demographic information related to my experience and qualifications as outlined in the Participant Information Statement

□ YES □ NO

I understand that my personal information will remain confidential to the researchers.

I have had the opportunity to have questions answered to my satisfaction.

NEWCASTLE

Signature:	Date:

RIDEC Renwick Centre II admini stered by Tite Royal in situate for Desitand Blind Children in a millation with the University of Newcastle, Australia (CRICOS Provider Number; 00.1034)

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Appendix B.7 – Participant Information Statement for Caregivers: Study 2



Campus: 361-365 North Rocks Road North Rocks NSW 2151 Australia Postal Address: Private Bag 29 Paramatta NSW 2124 Australia Telephone +61 29872 0372 Facsimile +61 29872 0874 Email: melissa.mccarthy@uon.edu.au GregJeigh@ridbc.org.au

Information Statement for Primary Caregivers for the Research Project: Early intervention for children with hearing loss: a comparison of telepractice and in-person settings Document Version [5], dated [25/05/2016]

You are invited to participate in the research project *Early intervention for children with hearing loss: a comparison of telepractice and in-person settings.* Melissa McCarthy, PhD candidate at the University of Newcastle, Professor Greg Leigh, Director of RIDBC Renwick Centre and Professor Michael Arthur-Kelly of the University of Newcastle are conducting this research as part of Ms. McCarthy's studies in the Doctor of Philosophy (Education) program at the University of Newcastle, supervised by Professor Greg Leigh, Director of RIDBC Renwick Centre and Professor Michael Arthur-Kelly of the University of Newcastle, and Professor Greg Leigh, Director of RIDBC Renwick Centre and Professor Greg Leigh, Director of RIDBC Renwick Centre and Professor Greg Leigh, Director of RIDBC Renwick Centre and Professor Michael Arthur-Kelly.

Why is the research being done?

Previous research has shown that specific early intervention practices lead to better outcomes for children and families. The purpose of the research is to gather input from parents and professionals regarding the use of those practices in RIDBC early intervention programs for children who are deaf or hard of hearing and their families. The findings of this study will have value for children who are deaf or hard of hearing and their families, the professionals who work with them, service providers and policy-makers at RIDBC and in the wider field of early intervention. Your assistance would be greatly appreciated.

Who can participate in the research?

All parents of children who are deaf or hard of hearing and enrolled in an RIDBC early intervention program are invited to participate in a survey. We are seeking input from the child's primary caregiver – the person who participates regularly in their child's early intervention sessions.

What would you be asked to do?

If you agree to participate, you will be asked to complete a questionnaire about your experiences with RIDBC early intervention sessions.

The researchers will also require information about you/your child's early intervention history, child demographics and family circumstances. This includes information related to your child's gender, age, hearing loss, amplification, other disabilities and frequency/duration/consistency of early intervention. Family information related to languages used, communication mode, parental level of education and socio-economic status will also be requested. You can provide this information either by completing the demographic section of the questionnaire or, with your consent, Melissa McCarthy (student researcher) can access this information, and only this information, through existing RIDBC records for you/your child

What choice do you have?

Participation in this research is entirely your choice. Only those people who give their informed consent will be included in the project. Whether or not you decide to participate, your decision will not disadvantage you, your child, or the professionals who work with you.

If you do decide to participate, you may withdraw from the project at any time without giving a reason and have the option of withdrawing any data that identifies you.

How much time will it take?

The questionnaire will take approximately 15 minutes to complete.

NEWCASTLE



RIDBG Rerwick Centre is administered by The Royal Institute for Deaf and Blind Children in affiliation with the University of Newcastle, Australia (CRICOS Provider Number: 00109J)

What are the risks and benefits of participating?

There are no anticipated risks associated with participating in this research. Your survey responses will be combined with responses from other primary caregivers to form a group overview of the use of specific practices in RIDBC early intervention programs. This information will help to improve the early intervention services provided to children who are deaf or hard of hearing and their families at RIDBC, and in the field more broadly.

How will your privacy be protected?

Any information collected by the researchers which might identify you will be stored securely and only accessed by the researchers unless you consent otherwise, except as required by law. To ensure confidentiality, names will be replaced by numerical identifier codes on written documents (with the exception of consent forms). Personal information about participants will not be disclosed without their prior consent.

Physical data (printed questionnaires and consent forms) will be stored in a locked filing cabinet at the RIDBC Renwick Centre. Data will be retained for a minimum of 5 years as per University of Newcastle requirements.

How will the information collected be used?

The data collected will contribute towards a thesis to be submitted for Ms. McCarthy's Doctor of Philosophy degree and will be presented in academic publications and conferences. Individual participants will not be named or identified in any reports arising from the project.

Non-identifiable data may be also be shared with other parties to encourage scientific scrutiny, and to contribute to further research and public knowledge, or as required by law.

A summary of the results will be available to participants in the form of a report following publication.

What do you need to do to participate?

Please read this Information Statement and be sure you understand its contents before you consent to participate. If there is anything you do not understand, or you have questions, please contact the researchers.

If you would like to participate, please complete the attached Consent Form and questionnaire. Both forms can be returned to Melissa McCarthy by mail in the enclosed pre-paid envelope. (Melissa McCarthy, c/o RIDBC, Private Bag 29, Parramatta NSW 2124).

Further information

If you would like further information please contact Melissa McCarthy (<u>melissa.mccarthy@uon.edu.au</u> or 9872 0240) or Greg Leigh (<u>greg.leigh@ridbc.org.au</u> or 9872 0372)

Thank you for considering this invitation.

Professor Greg Leigh Chief Investigator

Melissa McCarthy Student Researcher

Professor Michael Arthur-Kelly Co-Investigator

Complaints about this research

This project has been approved by the University's Human Research Ethics Committee, Approval No. H-2015-0205

Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to the researcher, or, if an independent person is preferred, to the Human Research Ethics Officer, Research Office, The Chancellery, The University of Newcastle, University Drive, Callaghan NSW 2308, Australia, telephone (02) 49216333, email Human-Ethics@newcastle.edu.au.





RIDBC Renwick Centre is administered by T he Royal Institute for Deaf and Blind Children in affiliation with the University of Newcastle, Australia (CRICOS Provider Number: 00109J)

Appendix B.8 – Consent form for Caregivers: Study 2



Campus: 361-365 North Rocks Road North Rocks NSW 2151 Australia

Postal Address: Private Bag 29 Parramatta NSW 2124 Australia

Telephone +61 2 9872 0372 Facsimile +61 2 9872 0824

Email: mellissa.mccarthy@uon.edu.au Greg.leigh@ridbc.org.au

Caregiver Consent Form for the Research Project: Early intervention for children with hearing loss: a comparison of telepractice and inperson settings Professor Greg Leigh, Professor Michael Arthur-Kelly, Ms. Melissa McCarthy

Document Version [4]; dated [28/03/2016]

I agree to participate in the above research project and give my consent freely. I understand that I am not obligated to participate and my decision to participate/not participate will have no impact on the services my child receives at RIDBC.

I understand that the project will be conducted as described in the Information Statement, a copy of which I have retained.

I understand that I can withdraw from the project at any time and do not have to give any reason for withdrawing.

I consent to:

- completing a brief questionnaire;
 YES INO
- Melissa McCarthy, student researcher, accessing RIDBC files for the specific purpose of collecting demographic information related to my child's early intervention history and family circumstances as outlined in the Participant Information Statement. (optional)
 YES NO

I understand that my personal information will remain confidential to the researchers.

I have had the opportunity to have questions answered to my satisfaction.

Print Name:		
Signature:	Date:	
Contract Royal Institute for Deaf and Blind Children	RIDBC Renwick Centre is administered by The Royal Institute for Dea affiliation with the University of Newcastle, Australia (CRICOS Pro	f and Blind Children in vider Number: 00109J)

Appendix B.9 – Participant Information Statement for Practitioners: Study 3



Campus: 361-365 North Rocks Road North Rocks NSW 2151 Australia

Postal Address: Private Bag 29 Parramatta NSW 2124 Australia

Telephone +61 2 9872 0372 Facsimile +61 2 9872 0824

Email: melissa mocanh y@uon.edu.au GregJeigh @ridbo.org.au

Information Statement for Practitioners for the Research Project: Early intervention for children with hearing loss: a comparison of telepractice and in-person settings (Part 2) Document Version [6]; dated [07/04/2017]

Thank you for your participation in the first phase of the research project *Early intervention for children* with hearing loss: a comparison of telepractice and in-person settings. As a result of your prior participation, you are invited to participate in the second phase of the research project. Melissa McCarthy, PhD Candidate at the University of Newcastle, Professor Greg Leigh, Director of RIDBC Renwick Centre and Professor Michael Arthur-Kelly of the University of Newcastle are conducting this research as part of Ms. McCarthy's studies in the Doctor of Philosophy (Education) program at the University of Newcastle, supervised by Professor Greg Leigh and Professor Michael Arthur-Kelly.

Why is the research being done?

Previous research has shown that specific early intervention practices lead to better outcomes for children and families. The purpose of the research is to gather input from parents and professionals regarding the use of those practices in RIDBC early intervention programs for children who are deaf or hard of hearing and their families. The findings of this study will have value for children who are deaf or hard of hearing and their families, the professionals who work with them, services providers and policymakers at RIDBC and in the wider field of early intervention. Your assistance would be greatly appreciated.

Who can participate in the research?

Some RIDBC practitioners who have completed the questionnaire for this project and provide early intervention services to children who are deaf or hard of hearing and their families are invited to participate.

Eligible practitioners include those who work with families of children who are deaf or hard of hearing where the child:

- Has been enrolled in an RIDBC early intervention program for at least two months
- Is between birth and eight years of age and receives intervention sessions from RIDBC at least monthly
- Has a diagnosed hearing loss that qualifies the child for enrolment in an RIDBC early intervention
 programHas hearing loss as the only developmental concern currently identified
- Uses spoken English as the primary language of early intervention sessions

What would you be asked to do?

If you agree to participate, you will be asked to video record your usual early intervention sessions with each consenting family on four occasions over a period of ten weeks and complete a fidelity checklist for each session, including a copy of the session plan.

The researchers will provide you with two specific activities to be completed during this period. All materials and instructions will be provided. If required, researcher support will be provided during the session to support administration of the tasks and provide technical support for video recording.

What choice do you have?

Participation in this research is entirely your choice. Only those people who give their informed consent will be included in the project. Whether or not you decide to participate, your decision will not disadvantage you or the children/families with whom you work.





RIDEC Renwick Centre is administered by The Royal institute for Destand Bind Children in affiliation with the University of Newcastle, Australia (CRICOS Provider Number: 60 1954) If you do decide to participate, you may withdraw from the project at any time without giving a reason and have the option of withdrawing any data which identifies you.

How much time will it take?

If you choose to participate, video recording will take place during your regularly scheduled session times. Completion of the fidelity checklist should take less than five minutes per session.

What are the risks and benefits of participating?

There are no anticipated risks associated with participating in this research. Video data will be analysed to investigate patterns of use of certain identified practices within RIDBC early intervention programs as a whole and de-identified data will be aggregated to ensure adequate protection of the reputation of individual practitioners.

How will your privacy be protected?

Any information collected by the researchers which might identify you will be stored securely and only accessed by the researchers unless you consent otherwise, except as required by law. To ensure confidentiality, names will be replaced by numerical identifier codes on written documents (with the exception of consent forms). Personal information about participants will not be disclosed without their prior consent.

Digital data (including video recordings) will be stored securely on password-protected computers. Physical data (consent forms) will be stored in a locked filing cabinet at the RIDBC Renwick Centre. Data will be retained for a minimum of 5 years as per University of Newcastle requirements.

Individual participants will not be named or identified in any reports or publications arising from the project.

How will the information collected be used?

The data collected will contribute towards a thesis to be submitted for Ms. McCarthy's Doctor of Philosophy degree and will be presented in academic publications and conferences. Individual participants will not be named or identified in any reports arising from the project. If requested, you will be able to review the recording to edit or erase your contribution.

Non-identifiable data may be also be shared with other parties to encourage scientific scrutiny, and to contribute to further research and public knowledge, or as required by law.

A summary of the aggregated results will be available to participants in the form of a report following publication. If requested, a summary of your individual data will be provided to you.

What do you need to do to participate?

Please read this Information Statement and be sure you understand its contents before you consent to participate. If there is anything you do not understand, or you have questions, please contact the researchers.

If you would like to participate, please complete the attached Consent Form to confirm your willingness to participate and return to Melissa McCarthy by email at <u>Melissa.McCarthy@uon.edu.au</u> or by mail in the enclosed pre-paid envelope. She will then contact you to discuss details of eligible families and recording dates.

Further information

If you would like further information please contact Melissa McCarthy (<u>melissa.mccarthv@uon.edu.au</u> or 9872 0240) or Greg Leigh (<u>greg.leigh@ridbc.org.au</u> or 9872 0372)

Thank you for considering this invitation.

Professor Greg Leigh Chief Investigator

Co Royal Institute for Deaf and Blind Children



Ms. Melissa McCarthy Student Researcher Professor Michael Arthur-Kelly Co-Investigator

RIDBC Renwick Centre is administered by The Royal in (Nutle for Destand Blind Children in a milation with the University of Newcastle, Australia (CRICOS Provider Number; 00 1083)

Complaints about this research

This project has been approved by the University's Human Research Ethics Committee, Approval No. H-2015-0205

Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to the researcher, or, if an independent person is preferred, to the Human Research Ethics Officer, Research Office, The Chancellery, The University of Newcastle, University Drive, Callaghan NSW 2308, Australia, telephone (02) 49216333, email <u>Human-Ethics@newcastle.edu.au</u>.





RIDEC Renvick Centre is administered by Tite Royal in Stute for Deartand Blind Officien in a milation with the University of Newcartle, Australia (CRICOS Provider Number: 00 1053)

Appendix B.10 – Consent form for Practitioners: Study 3



Campus: 361-365 North Rocks Road North Rocks NSW 2151 Australia

Postal Address: Private Bag 29 Parramatta NSW 2124 Australia

Telephone +61 2 9872 0372 Facsimile +61 2 9872 0824

Email: mellissa.mccarthy@uon.edu.au GregJeigh@ridbc.org.au

Practitioner Consent Form for the Research Project Early intervention for children with hearing loss: a comparison of telepractice and inperson settings (Part 2)

Professor Greg Leigh, Professor Michael Arthur-Kelly, Ms. Melissa McCarthy

Document Version [5]; dated [24/05/2016]

I agree to participate in the above research project and give my consent freely. I understand that I am not obligated to participate and my decision to participate/not participate will have no impact on my employment.

I understand that the project will be conducted as described in the Information Statement, a copy of which I have retained.

I understand I can withdraw from the project at any time and do not have to give any reason for withdrawing.

I consent to:

 the video recording of regularly scheduled early intervention sessions with each consenting family on four occasions during a ten-week period and completing related documentation (e.g., fidelity checklist and session plan).

I understand that my personal information will remain confidential to the researchers.

I have had the opportunity to have questions answered to my satisfaction.

Print Name:

Signature:

Date:

Ca Royal Institute for Deaf and Blind Chikiren



RIDEC Renvick Centre II administered by The Royal in (Mute for Deat and Elind Children in a Milation with the University of Newcaste, Australia (CRICOS Provider Number: 00 103.)

Appendix B.11 – Participant Information Statement for Caregivers: Study 3



Campus: 361-365 North Rocks Road North Rocks NSW/2151 Australia

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Information Statement for Primary Caregivers for the Research Project: Early intervention for children with hearing loss: a comparison of telepractice and in-person settings (Part 2)

Document Version [6]; dated [07/04/2017]

Thank you for your participation in the first phase of the research project *Early intervention for children with hearing loss: a comparison of telepractice and in-person settings*. As a result of your prior participation, you are invited to participate in the second phase of the research project. Melissa McCarthy, PhD candidate at the University of Newcastle, Professor Greg Leigh, Director of RIDBC Renwick Centre and Professor Michael Arthur-Kelly of the University of Newcastle are conducting this research as part of Ms. McCarthy's studies in the Doctor of Philosophy (Education) program at the University of Newcastle, supervised by Professor Greg Leigh and Professor Michael Arthur-Kelly.

Why is the research being done?

Previous research has shown that specific early intervention practices lead to better outcomes for children and families. The purpose of the research is to gather input from parents and professionals regarding the use of those practices in RIDBC early intervention programs for children who are deaf or hard of hearing and their families. The findings of this study will have value for children who are deaf or hard of hearing and their families, the professionals who work with them, services providers and policy-makers at RIDBC and in the wider field of early intervention. Your assistance would be greatly appreciated.

Who can participate in the research?

Some parents of children who are deaf or hard of hearing who have completed the questionnaire for this project and are currently enrolled in an RIDBC early intervention program are invited to participate.

Eligible participants include families of children who are deaf or hard of hearing where the child:

- has been enrolled in an RIDBC early intervention program for at least two months
- attends early intervention sessions at least once a month
- is between birth and eight years of age
- has a diagnosed hearing loss
- · has hearing loss as the only developmental concern currently identified
- uses spoken English as the primary language of the early intervention sessions

What would you be asked to do?

If you agree to participate, your usual early intervention sessions will be video recorded on four occasions over a period of ten weeks. You will not be asked to do anything other than participate as usual in your scheduled early intervention sessions.

What choice do you have?

Participation in this research is entirely your choice. Only those people who give their informed consent will be included in the project. Whether or not you decide to participate, your decision will not disadvantage you, your child, or the professionals who work with you.

If you do decide to participate, you may withdraw from the project at any time without giving a reason and have the option of withdrawing any data that identifies you.

How much time will it take?

If you choose to participate, your early intervention sessions will be video recorded during your regularly scheduled time session times.





RIDBC Renvice Centre (riadmini stered by Tite Royal in study for Destand Blind Children in a filiation with the University of New castle. Australia (CRICOS Provider Number: 001054)

What are the risks and benefits of participating?

There are no anticipated risks associated with participating in this research. Video data will be analysed to investigate patterns of use of certain identified practices in RIDBC early intervention programs. This information will help to improve the early intervention services provided to children who are deaf or hard of hearing and their families at RIDBC, and in the field more broadly.

How will your privacy be protected?

Any information collected by the researchers that might identify you will be stored securely and only accessed by the researchers unless you consent otherwise, except as required by law. To ensure confidentiality, names will be replaced by numerical identifier codes on written documents (with the exception of consent forms). Personal information about participants will not be disclosed without their prior consent.

Digital data (including video recordings) will be stored securely on password-protected computers. Physical data (consent forms) will be stored in a locked filing cabinet at the RIDBC Renwick Centre. Data will be retained for a minimum of 5 years as per University of Newcastle requirements.

How will the information collected be used?

The data collected will contribute towards a thesis to be submitted for Ms. McCarthy's Doctor of Philosophy degree and will be presented in academic publications and conferences. Individual participants will not be named or identified in any reports arising from the project. If requested, you will be able to review the recording to edit or erase your contribution.

Non-identifiable data may be also be shared with other parties to encourage scientific scrutiny, and to contribute to further research and public knowledge, or as required by law.

A summary of the results will be available to participants in the form of a report following publication.

What do you need to do to participate?

Please read this Information Statement and be sure you understand its contents before you consent to participate. If there is anything you do not understand, or you have questions, please contact the researchers.

If you would like to participate, please complete the attached Consent Form to confirm your willingness to participate and return to Melissa McCarthy by email at <u>Melissa.mccarthy@uon.edu.au</u> or by mail in the enclosed pre-paid envelope. She will then contact you to discuss details of recording dates.

Parent / Guardian consent:

If you are consenting on behalf of a child or young person under 18 years of age, and they can understand what is being asked of them, please discuss the project with them before making a decision. Where a parent/guardian consents to their child or young person participating, child assent will be sought on the day and the final decision about participating will rest with the child/young person.

Further information

If you would like further information please contact Melissa McCarthy (<u>melissa.mccarthv@uon_edu.au</u> or 9872-0240) or Greg Leigh (<u>areg.leigh@ridbc_org.au</u> or 9872-0372)

Thank you for considering this invitation.

Complaints about this research

Professor Greg Leigh Chief Investigator

Melissa McCarthy Student Researcher

Professor Michael Arthur-Kelly Co-Investigator

This project has been approved by the University's Human Research Ethics Committee, Approval No. H-2015-0205

Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to the researcher, or, if an independent person is preferred, to the Human Research Ethics Officer, Research Office, The Chancellery, The University of Newcastle, University Drive, Callaghan NSW 2308, Australia, telephone (02), 49216333, email <u>Human-</u> <u>Ethics@newcastle.edu.au</u>.





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Appendix B.12 – Consent form for Caregivers: Study 3



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Caregiver Consent Form for the Research Project: Early intervention for children with hearing loss: a comparison of telepractice and inperson settings (Part 2) Professor Greg Leigh, Professor Michael Arthur-Kelly, Ms. Melissa McCarthy

Document Version [5]; dated [25/05/2016]

I agree, and I agree for my child, to participate in the above research project and give my consent freely. I understand that I am not obligated to participate and my decision to participate/not participate will have no impact on the services my child receives at RIDBC.

I understand that the project will be conducted as described in the Information Statement, a copy of which I have retained.

I understand I, or my child, can withdraw from the project at any time and do not have to give any reason for withdrawing. I understand my child's assent will be sought again on the day of recording.

I consent to:

 the video recording of four (4) regularly scheduled early intervention sessions during a ten-week period.

I understand that my personal information will remain confidential to the researchers.

I have had the opportunity to have questions answered to my satisfaction.

APPENDIX C

INSTRUMENTS

Appendix C.1 – Practitioner Questionnaire (MPOC-SP)





Please tell us about yourself.

1. Please provide your full name (including surname).

2. Which RIDBC Department(s) do you work in?

- ELP(HI)
- Teleschool
- Both ELP(HI) and Teleschool
- Other write in:

3. What percentage of time do you spend working in each department during a typical week?

ELP (HI)	
Teleschool	
Other – please specify	
	100%

4. Where is your primary work location for RIDBC?

North Rocks		Gosford	Lismore
Australian Hearing Hub		Hunter	Darwin
Liverpool		Rouse Hill (HTC)	Other - write in
Nepean		Waverley (MRC)	
hich other RIDBC sites do	you work	at (with families)?	
hich other RIDBC sites do North Rocks Australian Hearing Hub	you work	at (with families)? Gosford Hunter	Lismore Darwin
hich other RIDBC sites do North Rocks Australian Hearing Hub Liverpool	you work	at (with families)? Gosford Hunter Rouse Hill (HTC)	Lismore Darwin Other - write in

6. Do you currently use telepractice with any of the families on your caseload?

YES

NO

If yes, what percentage of families on your caseload use telepractice?

7. Which of the following categories best describes you?

	Speech Pathologist
	Teacher of the Deaf
	Early Childhood Teacher
	Special Education Teacher
	Audiologist
\square	Other - write in:

8. Please list all q	ualifications relevant to your current role.
Qualification 1	
Qualification 2	
Qualification 3	
Qualification 4	
Qualification 5	

9. How long have you been working in your current department(s)?

	N/A	Less than 6 months	6-12 months	12-24 months	More than 24 months
ELP(HI)					
Teleschool					
Other – write in:					

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We would like to understand and measure the actual experiences and behaviours of service providers who work with children with long-term health or developmental problems and their families. In particular, we wish to know about <u>your</u> perceptions of the service you have been providing over the past year.

These questions are based on what parents have told us about the way services are sometimes offered to their families. Specifically, each question asks you to indicate <u>to what extent</u> you actually do each of the behaviours described, on a scale from 1 (Not at All) to 7 (To a Very Great Extent). Please note that the zero value (0) is used only if the situation described does not apply to you. Please mark the number that corresponds to your answer for each question.

For each question, we would like you to think about the degree to which you displayed each of the behaviours described in this questionnaire. The rating you select should **NOT** represent the frequency with which you engaged in each particular behaviour, but rather your level of involvement and investment in practising it.

The services you provide may bring you into contact with many individuals within a family. We have provided a list of who those family members may be.

CHILD: refers to the child with a disability.

PARENTS: refers to the parents or legal guardians of the child with a disability

FAMILY: refers to the child with a disability and his/her parents. Family may also include siblings, grandparents, etc.

INSTRUCTIONS:

1. We would like you to describe your "<u>actual</u>" behaviour, rather than what you feel would be "ideal" service. We recognise that professionals may be unable to display behaviour to the extent they might wish, due to caseload size, policies, and other constraining factors. Please be assured that your **confidential** responses will not be viewed as a judgement of you or how you **provide services**.

2. Please recognise that just because a behaviour is addressed by this measure it **DOES NOT** mean that it is necessarily an important behaviour for all professions or to all professionals. Thus, do not feel that selecting a low number is equivalent to giving yourself a poor evaluation.

3. We would like you to think about <u>your experiences</u> as a service provider with children with disability, and their families, <u>over the past year</u>. We are interested in your personal thoughts and would appreciate you completing this questionnaire on your own without discussing it with anyone.

4. Please contact the researchers if you have any questions or concerns.

	Indicate how much this event or situation happens to you.							
IN THE PAST YEAR, TO WHAT EXTENT DID YOU	To a Very Great Extent	To a Great Extent	To a Fairly Great Extent	To a Moderate Extent	To a Small Extent	To a Very Small Extent	Not at all	Not Applicable
 suggest treatment/management activities that fit with each family's needs and lifestyle? 	7	6	5	4	3	2	1	0
 offer parents and children positive feedback or encouragement (e.g., in carrying out a home program) 	7	6	5	4	3	2	1	0
 take the time to establish rapport with parents and children? 	7	6	5	4	3	2	1	0
 discuss expectations for each child with other service providers, to ensure consistency of thought and action? 	7	6	5	4	3	2	1	0
 tell parents about options for services or treatments for their child (e.g., equipment, school, therapy, etc.)? 	7	6	5	4	3	2	1	0
6accept parents and their family in a nonjudgemental way?	7	6	5	4	3	2	1	0
trust parents as the "experts" on their child?	7	6	5	4	3	2	1	0
 discuss/explore each family's feelings about having a child with special needs (e.g., their worries about their child's health or function)? 	7	6	5	4	3	2	1	0
anticipate parents' concerns by offering information even before they ask?	7	6	5	4	3	2	1	0
10make sure parents had a chance to say what was important to them?	7	6	5	4	3	2	1	0
11let parents choose when to receive information and the type of information they wanted?	7	6	5	4	3	2	1	0
12help each family to secure a stable relationship with at least one service provider who works with the child and parents over a long period of time?	7	6	5	4	3	2	1	O
13answer parent's questions completely?	7	6	5	4	3	2	1	0
14tell parents about the results from tests and/or asessments?	7	6	5	4	3	2	1	0
15provide parents with written information about their child's condition, progress, or treatment?	7	6	5	4	3	2	1	0

5								
	Indicate	e <u>how m</u>	<u>uch</u> this	event or si	ituation	happens t	o you.	
IN THE PAST YEAR, TO WHAT EXTENT DID YOU	To a Very Great Extent	To a Great Extent	To a Fairly Great Extent	To a Moderate Extent	To a Small Extent	To a Very Small Extent	Not at all	Not Applicable
16tell parents details about their child's services, such as the types, reasons for and durations of treatment/management?	7	6	5	4	3	2	1	0
17treat each parent as an individual rather than as a "typical" parent of a child with a "problem"?	7	6	5	4	3	2	1	0
18treat parents as equals rather than just as the parent of a patient (e.g., by not referring to them as "Mom" or "Dad")?	7	6	5	4	3	2	1	0
19make sure parents had opportunities to explain their treatment goals and needs (e.g., for services or equipment)?	7	6	5	4	3	2	1	0
20help parents feel like a partner in their child's care?	7	6	5	4	3	2	1	0
21help parents to feel competent in their roles as parents?	7	6	5	4	3	2	1	0
22treat children and their families as people rather than as "cases" (e.g., by not referring to the child ad families by diagnosis, such as "the spastic diplegic")?	7	6	5	4	3	2	1	0

The next set of questions asks "to what extent did you (or your organisation)...?" By "organisation" we mean the department or program from or through which you provide services.

	Indicate how much this event or situation happens to you.							
IN THE PAST YEAR, TO WHAT EXTENT DID YOU	To a Very Great Extent	To a Great Extent	To a Fairly Great Extent	To a Moderate Extent	To a Small Extent	To a Very Small Extent	Not at all	Not Applicable
23promote family-to-family "connections" for social, informational or shared experiences?	7	6	5	4	3	2	1	0
24provide support to help families cope with the impact of their child's chronic condition (e.g., informing parents of assistance programs, or counselling how to work with other service providers)?	7	6	5	4	3	2	1	0
25provide advice on how to get information or to contact other parents (e.g., through a community's resource library, support groups, or the internet)?	7	6	5	4	3	2	1	0

	Indicate how much this event or situation happens to you.							
IN THE PAST YEAR, TO WHAT EXTENT DID YOU	To a Very Great Extent	To a Great Extent	To a Fairly Great Extent	To a Moderate Extent	To a Small Extent	To a Very Small Extent	Not at all	Not Applicable
26provide opportunities for the entire family, including siblings, to obtain information?	7	6	5	4	3	2	1	0
27have general information available about different concerns (e.g., financial costs or assistance, genetic counselling, respite care, dating and sexuality)?	7	6	5	4	3	2	1	0

*Some practitioners who complete this survey will be invited to participate in further research. Are you happy for the researchers to contact you about research opportunities related to this survey?



Thank You!

Thank you for completing our survey. Your response is very important to us and will help us to improve the programs and supports we provide to families.

If you have any questions or concerns, please click on the link below to contact the researchers.

E-mail Us: Ms. Melissa McCarthy: Melissa.mccarthy@uon.edu.au

Professor Greg Leigh: Greg.Leigh@ridbc.org.au

Professor Michael Arthur-Kelly: Michael.Arthur-Kelly@newcastle.edu.au

Appendix C.2 – Caregiver Questionnaire (SPI)
--

PLEASE TELL US ABOUT YOUR FAMILY.

1) What is your name (including surname P:

Where do you live?

State:							
Suburb:							
Postcode:							

2) Which language (s) are used in your home?

Primary Language	
Second Language :	
Other Language(s):	

0

C

3) Which communication mode is used with your child at home? (please choose ore)

Spokes	English	ONLY

~				
	 .1		C.C. 24.00	
		08.0	S DOMA	
		. UI C	a Leane I	u aus

Austau ONLY	
-------------	--

 Picture communication symbols or other assistue communication deuice

Sign supported speech key word signs (Ising signs and speech at the same time)

Other-Write In:

4) How much total combined income did all members of your household earn last year?

C	\$D-\$9,999	0	\$50,000 - \$7 4,999	0	\$125,000 - \$1 49,999	0	\$200,000 or more
C	\$10,000 - \$24,999	0	\$75,000 - \$99,999	0	\$150,000 - \$174,999	0	Prefer not to an swer
0	\$25,000 - \$49,999	0	\$100,000 - \$124,999	0	\$175,000 - \$199,999	0	Other-Write In:

5) Please indicate your family's current employments tatus.

	Employed fill- time	Employed part- time	Cas∎al employme∎t	Paid study	Caring for family full-time	No paid employment
Mother	0	0	0	0	0	0
Father/ Otherpanent	0	0	0	0	0	0

6) How many years of formal education have your family completed?

	1-6γe ars of school attendar ce	7-12 γears of school attendarice	Diploma or centificate, e.g., TAFE	University qualification
Notier	0	0	0	0
Fabler/ Oblierpanent	0	0	0	0

1

PLEASE TELL US ABOUT YOUR CHILD.

7) Which hearing devices does your child currently use?

	Hearing aid	Cochlear implant	Bone Conductor	Bone Anchored Hearing Aid (BAHA-implantable)	FM	None	Other (please comment)
Left ear	0	0	0	0	0	0	0
Right ear	0	0	0	0	0	0	0
Comments:							

8) Please describe your child's degree of hearing loss.

	0-40 dB	41-60 dB	61-90 dB	90+ dB	ANSD	Other
Left ear	0	0	0	0	0	0
Right ear	0	0	0	0	0	0
Comments:						

9) When was your child's hearing loss first diagnosed?

LEFT ear	
RIGHT ear	
COMMENTS:	

10) When was your child first fitted with hearing aids (if applicable)?

LEFT ear	
RIGHT ear	
COMMENTS:	

11) When was your child's cochlear implant first switched on (if applicable)?

LEFT ear	
RIGHT ear	
COMMENTS:	

2

PLEASE TELL US ABOUT YOUR RIDBC SESSIONS.

12) Who is your current RIDBC Consultant?

13) How long have you been working with this consultant?

0	less than 6 months	0	more than two years
0	6-12 months	0	Other - Write In:
0	12-24 months	~	

14) Where do you and your child have your RIDBC sessions?

0	We have RIDBC Teleschool at home.	0	Our consultant comes to our home.
0	We have RIDBC Teleschool at a studio (e.g., a community centre, school, hospital)	0	Other - Write In:
0	We go to an RIDBC centre.		

15) How often do you have sessions with your RIDBC consultant?

0	Weekly	0	Monthly
0	Fortnightly	0	Other - Write In:

16) Which language(s) are used in your RIDBC sessions?

Primary Language	
Second Language:	
Other Language(s):	

17) Which communication mode is used with your child in your RIDBC sessions? (please choose one)

Spoken English ONLY

More than one spoken language

Sign supported speech/key word signs (using signs and speech at the same time)

Auslan	ONLY

Picture communication symbols or other assistive communication device

Other - Write In:

.

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INSTRUCTIONS:

The following questions are about how you feel about your ability to effectively influence your child's communication development. CIrcle a number from 1-7 to indicate how you feel.

- Please note the following:

 'session/therapy' refers to the individual sessoins you and your child have with your RIDBC consultant.
 'teacher/speech pathologist' refers to the RIDBC consultant who regularly works iwth you and your child.
 Question 31 refers to any speech pathology session you attend *in addition to* your regular RIDBC early
 interception sessions. This may be private speech pathology session so cochear implant habilitation sessions.

 intervention sessions. This may be private speech pathology sessions, cochlear implant habilitation sessions, or RIDBC Plus sessions.

18) How muc	h do you fee	I that you can	positively affect you	r child's <u>list</u>	ening develop	ment?
1	2	3	4	5	6	7
Not at all			Somewhat			Very much
19) How muc	h do you fee	I that you can	positively affect you	r child's <u>spe</u>	ech developn	<u>nent</u> ?
1	2	3	4	5	6	7
Not at all			Somewhat			Very much
20) How muc	h do you fee	I that you can	positively affect you	r child's <u>lan</u>	guage develo	oment?
1	2	3	4	5	6	7
Not at all			Somewhat			Very much
21) How muc	h do you fee	l that you can	positively affect you	r child's abi	lity to <u>express</u>	his or her thoughts?
1	2	3	4	5	6	7
Not at all			Somewhat			Very much
22) How muc	h do you fee	I that you know	w about and are able	e to <u>check an</u>	<u>id put on</u> your	child's hearing aids
and/or cochi	ear implants	on a daily bas	IS?			
🔍 N/A - My	child does no	t wear hearing a	aids/cochlear implants	3		
1	2	3	4	5	6	7
Not at all			Somewhat			Very much
23) How muc	h do you fee	I that you can	positively affect you	r child's <u>ove</u>	erall early deve	elopment?
1	2	3	4	5	6	7
Not at all			Somewhat			Very much
24) How muc techniques w	h do you fee vith your chil	l that you know d at home in d	w about and are able aily routines?	to do <u>speec</u>	:h/language a	ctivities or
1	2	3	1	5	6	7
Not at all	2	5	Somewhat	5	0	Verv much
						,
25) How muc (volume) and	h do you fee I/or cochlear	I that you know implant (progr	w about and are able rams) on a daily bas	to <u>adjust th</u> is?	<u>e settings</u> of y	our child's hearing aids/
O N/A - My	/ child does n	ot wear hearing	aids/cochlear implan	ts		
1	2	3	4	5	6	7
Not at all			Somewhat			Very much
26) How mus	h do you foo	that you know	wahout and are able	to check ve	ur child'e list	ning skills using the siv
Ling sounds	(a, oo, ee. s.	sh, m) on a da	ilv basis?	to <u>check</u> yo		ening skills using the six
1	2	3	4	5	6	7
Not at all	2	U	Somewhat	U	U	Very much

27) How much do you feel that you know how to help your child develop sounds?*

0	🖉 N/A - My cł	nild does not v	vear hearing ai	ds/cochlear impl	ants			
Not	1 at all	2	3	4 Somewhat	5	6	7 Very much	
28)	How much d	o you feel th	at you know h	ow to help you	r child develop	words?		
	1	2	3	4	5	6	7	
Not	at all			Somewhat			Very much	
29) dail	How hard is y basis?*	it for you to o	check your ch	ild's <u>listening s</u>	<u>kills</u> using the	Ling sounds (a	ı, oo, ee, s, sh, m) on a	a
	1	2	3	4	5	6	7	
Not	hard			Somewhat hard			Very hard	
30)	How hard is	it for you and	d your child to	<u>go to</u> schedule	ed appointmen	ts with the aud	iologist?	
	1	2	3	4	5	6	7	
Not	hard			Somewhat hard			Very hard	
31)	How hard is *this question re	it for you and fers to appointme	d your child to ents other than you	attend schedu Ir usual RIDBC early	led speech/lan	guage therapy	appointments ?	
N1-4	1	2	3	4	5	6	7	
NOT	nard			hard			very nard	
32)	How hard is *this question re	it for you and efers to your usua	d your child to I RIDBC session.	attend schedu	led early interv	ention sessior	IS?	
Not	1 hard	2	3	4 Somewhat hard	5	6	7 Very hard	
Not 33)	1 hard How many h	2 ours per day	3 will your child	4 Somewhat hard d wear his/her h	5 nearing aids an	6 d/or cochlear i	7 Very hard mplant?	
Not 33)	1 hard How many h N/A - My chil	2 ours per day d does not we	3 will your child ear hearing aids	4 Somewhat hard d wear his/her h s/cochlear implar	5 nearing aids an	6 d/or cochlear i	7 Very hard mplant?	
Not 33) <1 h	1 hard How many h N/A - My chil hour 1	2 ours per day d does not we -3 hours	3 will your child ear hearing aids 3-4 hours	4 Somewhat hard d wear his/her h s/cochlear implar 4-5 hours	5 hearing aids an hts 5-6 hours	6 d/or cochlear i 6-8 hours	7 Very hard mplant? > 8 hours	
Not 33) <1 h 34) mic	1 hard How many h N/A - My chil nour 1 How hard is rophones, se	2 ours per day d does not we -3 hours it for you to g etting, etc.) a	3 will your child ear hearing aids 3-4 hours check and listen nd/or cochlear	4 Somewhat hard d wear his/her h s/cochlear implan 4-5 hours en to your child r implant everyo	5 nearing aids an hts 5-6 hours I's hearing aids day?	6 d/or cochlear i 6-8 hours s (battery, ear n	7 Very hard mplant? > 8 hours noulds, cords,	
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37) How much	are you in	vited to participa	ate in sessions/the	rany with vo	ur child?*				
1	2	3	4	5	6	7			
Not at all	-		Sometimes		-	Always			
38) How much are you comfortable participating in the sessions/therapy with your child?*									
1	2	3	4	5	6	7			
Not at all comfortable			Somewhat comfortable			Very comfortable			
39) How much	does the t	eacher or speec	h pathologist <u>shov</u>	v you listeniı	ng/language ac	tivities?*			
1	2	3	4	5	6	7			
Not at all			Sometimes			Always			
40) How much teacher/therap	are you <u>co</u> pist is not t	omfortable doing here?*	the listening/lang	uage activiti	es with your ch	ild when the			
1	2	3	4	5	6	7			
Not at all comfortable			Somewhat comfortable			Very comfortable			
41) How comfo Individualised	ortable do Program?	you feel in helpir *	ng to develop your	child's Indiv	idualised Fami	ly Service Plan or			
1	2	3	4	5	6	7			
Not at all comfortable			Somewhat comfortable			Very comfortable			
42) How much family?	do you fee	el that the focus	of your child's ses	sion is with	your <u>child only</u>	versus the whole			
1	2	3	4	5	6	7			
Child only			Child and family equally			Parents only			
43) How much child's Individ	43) How much do you feel that the teacher of the deaf/speech pathologist includes you in the planning of your child's Individualised Family Service Plan (IFSP) or Individualised Program (IP)?*								
1	2	3	4	5	6	7			
Not at all			Somewhat			Very much			

44) Some families who complete this survey will be invited to participate in further research.

Are you happy for researchers to contact you about research opportunities related to this survey?

- O YES
- NO

Thank You!

Thank you for completing our survey. Your response is very important to us and will help us to improve the programs and supports we provide to families.

6

Appendix C.3 – Triadic Intervention Evaluation Rating Scale (TIERS)

Triadic Intervention Evaluation Rating Scale (TIERS) – Adapted by from Basu, 2007

To complete this task, you will be watching a 10-minute videotaped segment of an intervention session and answering a series of questions about what you have observed.

Rating Segment:	Rater:	Date:	
Rating beginent.	Rater.	Date.	

PRACTITIONER

Note: Relative to the number of opportunities, how frequently did the practitioner demonstrate the behaviour?

almost always = Behaviour observed frequently (opportunities rarely missed);

sometimes = Behaviour observed a few times (some opportunities missed);

rarely = Behaviour observed once (many opportunities missed);

never = Behaviour not observed (even if there was an opportunity).

	When there was an opportunity, did the practitioner	Almost Always	Sometimes	Rarely	Never
1	Maintain a position that would not interfere with the parent-child interaction?	4	3	2	1
2	Arrange aspects of the environment to promote parent- child interaction?	4	3	2	ī
3	Create/maintain opportunities for caregiver and child to interact?	4	3	2	1
4	Interact with the child and the caregiver together as a dyad, rather than separately?	4	3	2	ī
5	Share information about the child's actions or developmental sequence or about behaviours related to child's goals?	4	3	2	1
6	Comment on specific strategies that are working well?	4	3	2	1
7	Engage caregiver and child in activities that are relevant?	4	3	2	1
8	Engage caregiver and child in more than one type of activity?	4	3	2	1
9	Observe ongoing interactions and provide feedback about current actions?	4	3	2	.1
10	Connect skills being learned in current routines to other/future routines?	4	3	2	1
11	Explain how embedding strategies in daily routines helps child's development?	4	3	2	1
12	Answer caregiver concerns?	4	3	2	1
13	Listen to what the caregiver has to say (to the practitioner)?	4	3	2	1
14	Let caregivers make decisions and take charge of the intervention session?	4	3	2	1

15	Use and expand caregiver ideas during a session?	4	3	2	1
16	Evaluate progress with the caregiver?	4	3	2	1
17	Ask for caregiver input or invite feedback on what is observed?	4	3	2	1
18	Ask caregiver questions about routines, use of strategies, or child's actions?		3	2	1
19	Explicitly teach a strategy to the caregiver?		3	2	1
20	Allow sufficient time for the caregiver to practice strategies?	4	3	2	1
21	Suggest things to do with the child within and outside the intervention session?	4	3	2	1

CAREGIVER

Note: Relative to the number of opportunities, how frequently did the caregiver demonstrate the behaviour?

almost always

= Behaviour observed frequently (more than half of the opportunities); = Behaviour observed at least once (but not more than half of the opportunities)

- sometimes never
- = Behaviour not observed (even though an opportunity was present);
- no opportunity

= Behaviour not observed (no chance to demonstrate this behaviour)

	When there was an opportunity, did the caregiver	Almost Always	Sometimes	Never	No Opportunity
1	Remain at the child's eye-level while interacting with the child, or in the child's visual range at other times?	3	2	1	0
2	Join the child in what he or she is doing?	3	2	1	0
3	Provide encouragement for the child?	3	2	1	0
4	Choose or initiate activities for this session?	3	2	1	0
5	Focus on the session activities?	3	2	1	0
6	Take an active role in session activities?	3	2	1	0
7	Show a warm and positive affect toward the child?	3	2	1	0
8	Encourage the child to participate (by joining in)?	3	2	1	0
9	Attempt to increase opportunities for the child to participate?	3	2	1	0
10	Attempt to expand on the child's actions with an additional response?	3	2	1	0
11	Promote access to materials?	3	2	1	0
12	Share relevant information with the provider?	3	2	1	0

MEMBER ROLES

Identify the primary role assumed by each participant during the majority of the observation and mark the appropriate box for each. Only mark one box per participant.

CHILD		Actor		Active	Passive		Non-
	1000		1000	Observer	Observer	1.00	Participant
CAREGIVER		Actor		Active	Passive		Non-
	10			Observer	Observer		Participant
PRACTITIONER		Actor		Active	Passive		Non-
				Observer	Observer		Participant

RELATIONSHIPS BETWEEN TRIAD MEMBERS:

Use numbers 1-4 to label the frequency of occurrence of each relationship (indicated by the dotted lines), with 1 representing the most frequently occurring relationship and 4 representing the least frequently observed relationship. If a relationship does not occur during the observed segment, leave the line blank.

