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A Mixed Methods Investigation of Caregiver Coaching in an Early Intervention Model:  
Differences in Providers for Children with Hearing Loss

A dissertation submitted in partial fulfillment of the requirements for the degree of  
Doctor of Philosophy at Virginia Commonwealth University

by

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November 22, 2017

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## Dedication

This dissertation is dedicated to Kathryn, Taylor, Patrick, and their families. These remarkable children were the first kids with profound hearing loss I was blessed to have worked with who used Listening and Spoken Language. The perseverance their families showed in those first years of my professional career shaped who I am. I take those lessons with me each day. I thank God each day that you entrusted a 24-year-old new college graduate with your children. As a mother of three wonderful girls, I now realize what a leap of faith that must have been. This dissertation is for all of the children and their families I have had the honor to work with over the years. At the end of my career, the families are what I will remember and take with me.

## Table of Contents

List of Tables .....	ix
List of Figures .....	xi
ABSTRACT .....	xii
I. INTRODUCTION .....	1
Statement of the Problem .....	4
Statement of Purpose .....	5
Literature and Research Background .....	7
Research Questions .....	12
Summary of Methodology .....	13
Definition of Key Terms .....	14
II. REVIEW OF THE LITERATURE .....	21
Study Identification Procedures .....	21
Theoretical Framework .....	25
Universal Newborn Hearing Screening .....	29
Screening to Intervention .....	30
Measurable Outcomes in Children with Hearing Loss .....	37
Shifts in Early Intervention .....	41
Family-Centered Practice and Communication Choices .....	50

Professional Preparation .....	55
Certifications and Licensures.....	58
Professional and Caregiver Perspectives .....	64
Continuing Professional Development .....	65
National Agenda .....	71
Virginia State Performance: Part C Services .....	73
Summary of Literature Review.....	76
<b>III. METHODOLOGY .....</b>	<b>79</b>
Study Design.....	81
Data Collection and Analysis.....	85
Quantitative Phase .....	85
Participants and Setting.....	85
Measures .....	88
Data Collection Procedures.....	90
Validity and Reliability.....	91
Qualitative Phase .....	92
Participants and Setting.....	92
Data Collection Procedures and Instruments .....	93
Data Analysis Procedures .....	94
Trustworthiness.....	96
Role of the Researcher .....	97
Mixed Method Data Analysis Procedures .....	97
Ethical Considerations .....	98

Institutional Review Board .....	99
Summary of Methodology .....	99
IV. RESULTS .....	100
Data Management and Data Reduction .....	101
Survey Constructs .....	103
Quantitative Phase .....	106
Participants.....	106
Professional Preparation of Participants .....	109
Analysis of Quantitative Research Questions.....	114
Summary of Quantitative Phase Results.....	120
Qualitative Phase .....	121
Participants.....	121
Interview Data Analysis.....	125
Reliability and Credibility.....	125
Participant Group Themes .....	126
Overall Themes Related to Family-Child Outcome Requirements ...	139
Participant Recommendations .....	147
Document Analysis.....	152
Thematic Analysis of Documents.....	153
Content Comparison .....	155
Summary of Qualitative Phase Results.....	158
Mixed Method Analysis.....	159
Groupings and Qualitative Data.....	159

Systems Change .....	164
Summary of Mixed Method Analysis.....	166
Summary.....	166
V.    DISCUSSION.....	169
Summary of Results.....	170
Interpretation of Results.....	173
Implications.....	185
Practice.....	185
Policy .....	188
Research.....	189
Limitations .....	191
Conclusion .....	192
REFERENCES .....	195
APPENDICES	
Appendix A: Participant Information and Consent Form – Printable Version .....	209
Appendix B: Email Solicitation for Study Participation.....	213
Appendix C: Email Solicitation for Follow-Up Interview Participation .....	214
Appendix D: Survey .....	215
Appendix E: Beginning Interview Questions .....	223
Appendix F: A Priori Codes .....	224
Vita.....	226

## List of Tables

1.	Commonly Used Acronyms.....	20
2.	Comparison of Virginia UNHS Data 2006 and 2014 .....	33
3.	Demographic Information from the Gallaudet Research Institute Annual Survey of Children.....	40
4.	Caregiver Coaching and Intervention Strategies with Subsequent Results .....	48
5.	Essential Skill Areas Aligned with Professional Preparation Program, Certification, and Licensure Requirements.....	59
6.	Cronbach’s Alpha for Survey Constructs .....	92
7.	Stakeholder Groups and Missing Data .....	103
8.	Caregiver Coaching Constructs .....	104
9.	Auditory Skill Development Constructs.....	105
10.	Demographic Characteristics of Participants.....	108
11.	Areas of Virginia Represented by Participants.....	109
12.	Participant Experiences in Graduate Program Coursework .....	110
13.	Post-Graduate Professional Training Completed.....	112
14.	Desired Professional Development.....	113
15.	Mean and Standard Deviation of Survey Measures for the Total Sample and for Professional Designations.....	116

16.	Correlations Between Auditory Skill Development and Caregiver Coaching .....	117
17.	Speech-Language Pathologists: Correlations Between Auditory Skill Development and Caregiver Coaching .....	117
18.	Teachers for the Deaf/Hard-of-Hearing: Correlations Between Auditory Skill Development and Caregiver Coaching .....	118
19.	Developmental Specialists: Correlations Between Auditory Skill Development and Caregiver Coaching .....	119
20.	Other Professionals: Correlations Between Auditory Skill Development and Caregiver Coaching .....	120
21.	Demographic Characteristics of Interview Participants .....	122
22.	Participant Auditory Development Comfort Scores Compared to Entire Group and Professional Designation .....	123
23.	Participant Caregiver Coaching Comfort Scores Compared to Entire Group and Professional Designation .....	124
24.	Professional Development Examples from Participants with Associated Costs .....	147
25.	Collaborative Professionals Contained in Certification Documents .....	154
26.	Content Analysis of Regulatory Documents.....	157

## List of Figures

1.	Organizational or systems change using the Ambrose (1987) model.....	27
2.	System of support for families of children with hearing loss .....	78
3.	Explanatory Sequential Design: Early Intervention Providers: Differences and Perceptions in Training, Caregiver Coaching, and Auditory Skill Development.....	84
4.	Participant comfort with communication methodologies .....	114
5.	Themes present in qualitative interviews.....	127
6.	Mixed method display of quantitative and qualitative results with professional standards .....	163
7.	Ambrose model and future professional development .....	165

## Abstract

### A MIXED METHODS INVESTIGATION OF CAREGIVER COACHING IN AN EARLY INTERVENTION MODEL: DIFFERENCES IN PROVIDERS FOR CHILDREN WITH HEARING LOSS

By Alison R. King, Ph.D.

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy at Virginia Commonwealth University.

Virginia Commonwealth University, 2017

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Associate Professor

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The purpose of this research is to investigate the relationship between early intervention providers' backgrounds, and their perceptions of caregiver coaching and auditory skill development, to develop professional development programs. An explanatory sequential design was used with participants of varying backgrounds and experience. In the first phase of the study, participants responded to a survey regarding their educational background, and their comfort with caregiver coaching and auditory skill development. Survey results were analyzed

using Spearman's Ranked Correlational Coefficient (Spearman's  $r_s$ ) to form groups of participants from extreme cases. The second phase of the study consisted of participant interviews from each of the groups. Interviews were coded to identify themes present within and between groups. The information from both phases were analyzed to generate how professional preparation and certifications influence service delivery. Results were subsequently analyzed to determine potential improvements in the EI system, professional development, and policy.

*Keywords: Early intervention, caregiver coaching, Part C, hearing-impairment, hearing loss*

## Chapter I

### **Introduction**

My heart is singing for joy this morning! A miracle has happened!  
The light of understanding has shone upon my little pupil's mind,  
and behold, all things are changed!

Anne Sullivan (1866 - 1936)

Just as Anne Sullivan worked tirelessly to foster language development in her pupil Helen Keller, educators today do so with the advantage of early identification of hearing loss and early intervention. Currently, 98% of children in the United States are screened for hearing loss as required by the Early Hearing Detection and Intervention Act of 2010 (P.L. 111-337; CDC, 2014). The Joint Committee on Infant Hearing (JCIH, 2000) stated that all infants should be screened for hearing loss by one month of age, receive appropriate amplification by three months of age, and begin receiving EI services by six months of age to optimize language outcomes (also known as the *EHDI 1-3-6 Plan*). Once identified with a hearing loss, children are referred for Early Intervention (EI) through Part C of the Individuals with Disabilities Education Improvement Act (IDEA; 2004). EI services are essential for children with hearing loss due to their greater risk of acquiring delays in speech, language, and overall development as compared to their hearing peers (Cole, 2011; Conrad, 1979; Geers et al., 2008; JCIH 2000, 2007; Suskind,

2015; White, 2006; Yoshinaga-Itano & Apuzzo, 1998; Yoshinaga-Itano, 2003). Caregivers have choices in the delivery of services for their children by choosing Part C EI services and/or private providers. Between the years of 2012 and 2014, there were 457 children identified with hearing loss in Virginia through Universal Newborn Hearing Screening with 441 of those found eligible to receive EI services (UNHS; CDC 2012, 2013, 2014). Ultimately, 257 of the 441 children eligible obtained early intervention services. There were 251 children provided services through Part C and six using private providers from hospitals or clinics. Receiving timely early intervention services is necessary for children with hearing loss to be prepared to succeed in school (Yoshinaga-Itano, 2003). Many children with hearing loss eligible to receive these vital early intervention services in Virginia are not enrolled in the Part C EI system (CDC 2012, 2013, 2014).

Children with hearing loss in EI systems are provided services from distinct professional groups with varied educational backgrounds and professional training (ASHA 2004, 2008; JCIH 2007) that potentially affects how they provide caregiver coaching and what information they disseminate to parents. These professional groups have been identified as Teachers for the Deaf/Hard-of-Hearing (TDHH), Speech-Language Pathologists (SLPs), or Developmental Specialists. They guide parents through the beginning stages of coping with their child's hearing loss, assisting them in learning how to support their child in meeting developmental milestones in the natural environment, and aiding caregivers in accessing community resources (Cole & Flexer, 2016; Houston & Perigoe, 2010; JCIH 2000, 2007; Suskind, 2015; Yoshinaga-Itano, 2014).

Unfortunately, there is a shortage of professionals with specific educational training to work with families of children with hearing loss (American Speech-Language Hearing

Association, n.d.; JCIH, 2007; Proctor, Niemeier, & Compton, 2005). Thus, the American Speech-Language Hearing Association (ASHA) recommended EI services for children with hearing loss be provided by a multidisciplinary team potentially comprised of SLPs, TDHH, Audiologists, Early Childhood Special Educators, Physicians, and Social Workers with the family as the core of comprehensive services (ASHA, 2008). It is unknown if children in the EI system in Virginia are being provided services from this multi-disciplinary team secondary to a critical shortage of providers (ASHA, n.d.; JCIH, 2007; White, 2006).

The American Speech-Language Association (ASHA), the Alexander Graham Bell Association of the Deaf (AG Bell), and the Council for Exceptional Children (CEC) each have standards designed to meet minimal requirements for the: (a) accreditation of professional preparation programs; and/or (b) individual certifications and licensures necessary for serving children with hearing loss (AG Bell, 2012; ASHA, 2014; CEC, 2013). Additionally, professionals in Virginia are required to be certified as Early Intervention Professionals by meeting those discipline specific requirements (ASHA, 2014; CEC, 2013), passing online modules offered through the Infant & Toddler Connection of Virginia, and completing an online application (Infant & Toddler Connection of Virginia, n.d.). Medical advancements have created greater opportunities for children with hearing loss to use spoken communication methodologies (JCIH, 2000, 2007; Suskind, 2015; White, 2006; Yoshinaga-Itano, 2003). When given all communication options, and unbiased information, more than 85% of caregivers choose spoken language options for their children with hearing loss (Alberg, Wilson, & Roush, 2006; Anderson & Madell, 2014). However, professional preparation programs for TDHH, SLPs, and Developmental Specialists, nationwide, have not required auditory skill development or caregiver coaching coursework, fundamental for developing spoken language, within their

accreditation or certification standards (ASHA, 2014; CEC, 2013; Dolman 1988, 2008; White, 2006; Yoshinaga-Itano, 2014). The gap between research regarding evidence-based practices that afford opportunities to children with hearing loss identified early to communicate using spoken methods, and professional training in these practices, creates a pervasive problem in our healthcare and educational systems.

### **Statement of the Problem**

For over 30 years, research studies have documented the difficulty of children who are deaf or hard-of-hearing in obtaining academic skills comparable to their hearing peers secondary to delays in language acquisition necessary for higher level academics (Conrad, 1979; Sarant, Harris, & Bennet, 2015; Traxler, 2000). The effect of hearing loss on social, academic and language development theoretically can be mitigated through research-based early intervention programs focused on caregiver coaching (Scheetz, 2012; White, 2006; Yoshinaga-Itano, 2003). The goal of early hearing screening has been realized with 98% of children being screened by one month of age (CDC, 2014). Now, professionals are challenged to provide evidence-based practices to improve long-term academic and social outcomes. Meeting the goal of providing quality early intervention to all children with hearing loss requires professionals to acquire an advanced level of training and education (Houston & Perigoe, 2010; JCIH, 2007).

The Joint Committee on Infant Hearing (JCIH, 2007) suggested that guidelines addressing professional qualifications for providing family-centered intervention in EI programs be developed, adopted, and implemented. In a supplement to the JCIH 2007 position statement (2013), these essential skills were identified. The JCIH (2007; 2013) specifically stated auditory skills should be evaluated at nine, 18, 24, and 30 months of age. Additionally, Yoshinaga-Itano (2014) advocated for the development of appropriate professional development guidelines that

support evidence-based practices, despite the varied professional backgrounds of those who provide services in the Early Hearing Detection and Intervention (EHDI) and EI programs. JCIH (2007; 2013) and Yoshinaga-Itano (2014) stated EI professionals should have specialized training and expertise in the parents' chosen mode of communication including auditory skill development for children using spoken language methodologies. However, there is a lack of research regarding what skills EI providers currently possess, how they differ in their knowledge of auditory skill development and caregiver coaching based on their professional development, and how they are providing caregiver coaching to families of children with hearing loss.

In Virginia, the required annual performance report of child and family outcomes in EI indicated that of the 7,876 children receiving EI services through Part C, 47% did not make progress, made minimal progress, or did not make enough progress to demonstrate age-appropriate language skills (Virginia Infant & Toddler Connection; 2014). There is not a publicly available breakdown of these data by disability type. However, the Infant Toddler Online Tracking System of Virginia (ITOTS) documented 244 children with hearing loss receiving services in the EI system in Virginia from the period of December of 2014 to December of 2015. The State Systemic Improvement Plan (SSIP) for Early Intervention addresses the problem of inadequate progress in the mandated child outcomes with four improvement strategies. Two of the strategies address implementation of professional development targeting the areas of caregiver coaching and the use of evidence-based practices when delivering services.

### **Statement of Purpose**

The purpose of this research is to examine the relationship between the EI provider's background and their knowledge of caregiver coaching and auditory skill development by: (a) identifying the groups of professionals providing Part C EI services in Virginia; (b) identifying

the differences in their professional training programs and professional development; (c) examining their knowledge of caregiver coaching and auditory skill development; (d) discovering their lived experiences of how their training impacts service delivery; and (e) determining, based on their feedback, necessary professional trainings to link research to practice.

To address this purpose, this study used an explanatory sequential mixed methods research design with two distinct phases: quantitative followed by qualitative with priority given to the second qualitative phase (Creswell & Plano-Clark, 2011). The quantitative phase consisted of data collected through the use of a survey in order to develop groupings for the second qualitative phase. The results from the quantitative phase informed the purposeful sample selection, data collection, and data analysis used during the qualitative phase. The mixed methods approach used quantitative data to inform the qualitative design which provided a richer understanding of the participants' experiences. In the exploratory follow-up, the educational and training experiences of Teachers for the Deaf and Hard-of-Hearing (TDHH) and Speech-Language Pathologists (SLP), and the impact of their training on clinical practice in the early intervention system, were explored. The combining of quantitative and qualitative methods allowed the researcher to gain a more comprehensive understanding of EI professionals' training, education, and professional development needs than a single method approach would allow (Johnson & Onwuegbuzie, 2004). The data from interviews gave voice to the numeric data allowing the weaknesses of each approach to be addressed by the strengths of the other. The information from each phase are jointly displayed, and subsequently analyzed together, to determine potential changes in the EI system, professional development, and policy.

## **Literature and Research Background**

Researchers and practitioners who work with children who are deaf/hard-of-hearing agree that medical advancements, such as cochlear implants and high-powered digital hearing aids, have pushed the field of early intervention beyond any conceptualized vision of developing listening and spoken language that were afforded to this population 15 years ago (Cole & Flexer, 2016; Houston & Perigoe, 2011; Suskind, 2015). Consequently, early intervention practices and professional preparation programs are struggling to “catch-up” to provide the opportunities that improved hearing technologies have afforded children with hearing loss. However, in order to reduce the gap between medical and educational systems, researchers must examine the current infrastructure of professional training, and the differences in the essential skills needed to provide quality family-centered services to children with hearing loss.

### **Medical Advancements**

Suskind (2015) detailed the lowering of age of diagnosis of hearing loss from three years-of-age to three months since the implementation of Universal Newborn Hearing Screening (UNHS), and concomitantly lowered FDA regulations for cochlear implantation (Suskind, 2015). Current Food and Drug Administration (FDA) regulations permit children to receive cochlear implants at 12 months of age and less than 12 months under the recommendations of the physician (FDA, 2015; 2016). The fast-paced advancements of the medical community left the educational field in great need of researching family-centered practices and methods of training professionals. The push for research was based on a growing population that historically had not been provided services in EI due to previously having been identified after the age of three, when they were no longer eligible for EI services (Suskind, 2015). Now, EI professionals are tasked to

provide quality services with reported family and child outcome measures focused on language development (Infant Toddler Connection of Virginia, 2013).

Bobsin and Houston (2015) discussed the need for children to receive intensive auditory training from skilled professionals to develop spoken language in conjunction with cochlear implant use. Dettman et al. (2013) compared children with cochlear implants with matching demographic data and inclusion criteria regarding several measures of speech perception and language development. The researchers determined that children with cochlear implants using spoken modes of communication, focused on auditory skill development, had higher spoken speech and language outcomes than those using a visual system of communication. Moeller et al. (2013) determined specific speech, language, and auditory skill goals should be incorporated into daily routines for optimal progress in spoken language development.

### **Early Intervention**

The field of early intervention has been shaped by public policy. The Individuals with Disabilities Education Act of 1990 (IDEA; P.L. 101-476) coupled with state EHDI laws created an intersection of advancements in education and medicine that greatly impact families of children with hearing loss. EI services are provided in the natural environment consistent with the IDEA mandate, using a caregiver coaching model, and are provided by a range of professionals. EI professionals must have knowledge in cognitive, speech, language, and auditory skill development when working with children who have a hearing loss (Houston & Perigoe, 2010). Then, they must apply that knowledge to caregiver coaching in order for caregivers to make informed decisions regarding communication development for their children who are hard-of-hearing (Estabrooks, 2012; Hanft, Rush, & Shelden, 2003; Rice & Lenihan, 2005; Scheetz, 2012).

In 2014, 87.9% of the infants diagnosed with a hearing loss nationally were referred to Part C for EI services (CDC, 2014). The JCIH provided guidelines for appropriate early intervention (JCIH, 2007) and subsequently for essential skills for providers (JCIH, 2013). The updates from the 2000 position statement EI recommendations included: (a) all infants with hearing loss should be found eligible for early intervention services including those with unilateral losses; (b) establish central referral points of entry to ensure the specialized services needed for children with hearing loss; and (c) EI service providers (SLPs, Audiologist, and TDHH) should be professionals who have expertise in hearing loss.

### **Professional Preparation**

The supplement to the JCIH 2007 statement (2013) further detailed the essential skills of any professional providing early intervention services to this low-incidence population. The guidelines and essential skills emphasize family-centered practices, caregiver coaching, and expertise in a family's chosen mode of communication (JCIH, 2013). However, graduate training programs for EI professionals vary in required coursework and do not include specific coursework in coaching, but rather use an integrated approach (ASHA, 2014; CEC, 2013; Dolman, 1998; 2008) despite the federal requirements of professionals to provide parent coaching in EI service delivery (IDEA; P.L. 101-476).

In Virginia, there are six professional preparation programs for Speech-Language Pathologists (SLPs) and one training program for Teachers of the Deaf/Hard-of-Hearing (TDHH). There are specific course requirements that must be met to become certified to practice Speech-Language Pathology during completion of a master's level program (ASHA, 2014). Due to the unique overlap of medical advancements and deaf education, Speech-Language Pathology programs may also offer training in spoken methodologies or auditory skill development that are

the foundation for spoken communication methodologies (AG Bell, n.d.; Sheetz, 2012), but it is not required for national certification by ASHA (ASHA, n.d.). There are no programs in Virginia that offer additional coursework in auditory skill development (Dolman, 2008; oral deaf Education, 2008) or caregiver coaching. When using family-centered practices, it is essential for EI professionals to have knowledge of auditory skill development in order to provide services to the 85% of families who choose spoken language when presented with all options (Alberg, Wilson, & Roush, 2006; Anderson & Madell, 2014; Bobsin & Houston, 2015; Dettman et al., 2013; Moeller et al., 2013).

In contrast, the requirements of each state vary widely for TDHH to obtain educational licensure for teaching students who are Deaf or hard-of-hearing (Dolman, 2008; Dolman, 2010). In Virginia, the Department of Education requires candidates graduate from an approved collegiate undergraduate program in the state or have a major in special education with an additional 27 hours of coursework. These hours include least one course in each of the following: (a) foundations/legal aspects of special education; (b) characteristics of individuals with hearing impairments; (c) psycho-educational assessment; (d) instructional programming; (e) speech-language development; (f) behavior management; (h) audiology; (i) speech and hearing science; and (j) communication modalities. However, these additional courses do not include knowledge in signed exact English, American Sign Language, caregiver coaching, or the development of auditory skills (Virginia Department of Education, 2013). The Virginia Department of Education requirements, for those requesting an additional endorsement as a TDHH, are like the ASHA course requirements in that they both require knowledge of: (a) assessment; (b) speech-language development; (c) audiology; and (d) speech-hearing science. Caregiver coaching is not part of the additional requirements. The one training program for TDHH, located at Radford University,

is approved as a training program leading to the educational endorsement from the Virginia Department of Education, but it is not accredited by the Council on Education of the Deaf (CED, 2016). When their course selection is reviewed, they do not offer each of the 27 credits required of professionals from other states, nor a course targeted at the under age 3 population with caregiver coaching (Radford University, 2016).

### **Professional Perspectives**

Compton et al. (2009) explored the training and preparedness of North Carolina Speech-Language Pathologists (SLPs) to provide services to school-aged children with cochlear implants. The researchers used survey methodology and determined that most SLPs in the school systems felt they were not prepared to provide direct intervention to this population of children and lacked a working knowledge of amplification equipment. Without conducting statistical analyses of their data, Compton et al. (2009) concluded from the responses reported in percentages, there was a need for more research regarding the preparedness of TDHH and SLPs at state and national levels, to provide services to children with advanced technologies using spoken methodologies.

Similarly, Lenihan and Rice (2005) interviewed professionals from both SLP and TDHH educational backgrounds. The researchers found that many professionals believed their graduate programs did not adequately prepare them for the challenges in providing EI services, but that they gained important knowledge while working with families. EI providers indicated that their knowledge of child development and family-centered intervention was gained through mentoring experiences and transdisciplinary teams, and not while earning their respective degrees.

Consequently, the field has not discovered a way to determine how information is being disseminated to families because caregiver coaching has not been a targeted area of training in

teacher preparation or SLP preparation programs in Virginia. The results of the interviews by Rice and Lenihan (2005) did not identify: (a) which competencies in service delivery respondents believed they were inadequately prepared to provide; (b) how they provided services at the time; (c) how their service delivery changed as a result of professional development; (d) what professional development they received since obtaining their various professional degrees; and (e) how their post-graduate professional development guided their caregiver coaching. Knowledge and experience in each of these areas has a direct impact on caregiver coaching that has yet to be examined in-depth from the view of the professional providing these services.

### **Research Questions**

This research is guided by quantitative, qualitative, and mixed-methods research questions investigating caregiver coaching in an early intervention model. Specific questions include:

1. Phase One: Quantitative Research Questions

RQ1: How do participants' educational backgrounds relate to their comfort providing caregiver coaching?

RQ2: How do participants' educational backgrounds relate to their comfort with intervention targeting auditory skill development?

2. Phase Two: Qualitative Research Questions

RQ3: What are EI providers' perceptions regarding their educational background and professional experiences with caregiver coaching as applied to auditory skill development?

RQ4: How are EI providers' beliefs influenced by the family-child outcome requirements when providing coaching to families regarding communication development?

### 3. Mixed-Method Research Questions

RQ5: In what ways do the experiences of EI providers explain their perceptions of caregiver coaching and auditory skills development?

RQ6: How do the ASHA, CEC, and AG Bell standards influence any differences between the beliefs of EI providers regarding caregiver coaching and auditory skill development?

### **Summary of Methodology**

To study professional preparation of and caregiver coaching by early intervention providers, an explanatory sequential mixed method design was used where the quantitative data from the first phase was used to develop the qualitative data collection measures. The notation of this study is  $\text{quan} + \text{QUAL} = \text{explain results}$ . The qualitative data are given priority as the quantitative data was used to determine groups of early intervention providers and for selection of providers to be interviewed in the qualitative phase. Integration of data after both the quantitative and qualitative phases are completed and allowed the researcher to answer the mixed methods research questions and address how the standards from each professional designation influence their service delivery.

Challenges of the sequential explanatory design include the length of time to complete the in-depth qualitative portion and participant selection for the qualitative phase. Participants were selected based on extreme cases for inclusion to the qualitative portion and interviews completed to the point of saturation of data. Extreme cases were defined as representatives from each set of professionals responding to the survey varying greatly in their respective responses based on the mean and standard deviation. For example, participants chosen are those who indicated they have extensive educational background in auditory skill development or parent

coaching as well as those with no educational experience in these areas. Interviews were scheduled quickly after the completion and analysis of the quantitative phase of the study. Interviews were completed at the convenience of the participants over the phone. Phone and videoconferencing were made available to participants to expedite the interview scheduling process. Information sheets regarding the purpose of the study were given to all participants and informed consent obtained prior to any data collection procedures.

Meeting the needs of children with hearing loss is complex, requiring a specialized skill set for a variety of EI providers (Harrison et al., 2016; Houston et al., 2010; Houston & Perigoe, 2010; Yoshinaga-Itano, 2014). The professional preparation of EI providers, including Teachers for the Deaf and Hard-of-Hearing and Speech-Language Pathologists, and their perceptions regarding ongoing professional training is vital in the development of effective and meaningful preservice preparation and continuing education programs leading to improved service delivery for children with hearing loss. This study used mixed methods research in order to answer the research questions.

### **Definition of Key Terms**

For clarity, the following list of definitions and explanation of terms was used throughout this study. Additionally, Table 1 contains a list of acronyms used in the literature, policy documents, and by national organizations.

**AG Bell Academy for Listening and Spoken Language.** The AG Bell Academy, a subsidiary of the AG Bell Association of the Deaf and Hard-of-Hearing, was established in 2005 as an international certification council for professionals that have specific education, training, and qualifications to assist children in developing spoken language through audition (AG Bell Academy for Listening and Spoken Language; n.d., 2007, 2012).

**Auditory Brainstem Response.** Auditory Brainstem Response (ABR) is one of two possible physiologic measures used for newborn hearing screening and assessment. ABR can be completed while the infant is asleep or under sedation. Electrodes are attached to the head, sounds or clicks are presented through probes in the ear, and brain activity in response to sound is recorded thereby providing information regarding the functioning of the inner ear. When this assessment is completed as a screening rather than a full diagnostic assessment, only one loudness level is assessed (American Speech-Language Hearing Association, n.d.; National Center for Hearing Assessment and Management, 2016).

**Auditory skill development.** Auditory skill development refers to the ability of a child to process acoustic information at increasingly complex levels without the benefit of visual input based on the premises that: (a) children with normal hearing develop complex auditory skills without the benefit of direct intervention; (b) unisensory instruction is a viable communication option for developing spoken language in children with hearing loss in conjunction with optimal amplification; and (c) it is necessary for professionals providing auditory skill development to have specialized training (Erber, 1982; Ling, 1988; Pollack, 1970; Walker, 2009).

**Cochlear implants.** A cochlear implant (CI) is a surgically implanted device that provides direct electrical stimulation to the eighth cranial nerve inside the cochlea (inner ear). This stimulation bypasses damaged hair cells within the cochlea for patients with severe to profound sensorineural hearing loss to provide sound signals to the brain. The FDA approved CIs for children of 12 months of age in 2000 (NIH, 2010). As of 2012, 38,000 cochlear implants have been surgically implanted in children 17 years of age and younger in the US. Twenty-five thousand CIs were implanted in children ages 5 and younger (FDA, 2015).

**Caregivers.** The Division for Early Childhood of the Council for Exceptional Children (DEC) states that parental roles may be single parents, grandparents as parents, two parents of the same sex, and various combinations differing from the traditional mother-father roles (2015). Therefore, the term ‘caregivers’ refers to any person or persons taking on the nurturing roles as described by CEC to include: (a) affection; (b) self-esteem; (c) daily care; (d) socialization; and (e) education.

**Care theory.** Care theory as defined by Noddings (2012) states that care is the foundation for a relationship between two people. This relationship is characterized by caring, recognition, and reciprocity built upon the experiences of each person. People learn to be cared for, and it is that understanding that leads to them caring about others. Within this research, the ‘carer’ and ‘cared-for’ relationship exists between both the parent-child and the provider-parent relationships.

**Early intervention.** Early intervention is defined as the services provided to families and children with disabilities through IDEA Part C (2004) from birth through the age of three. These services are provided in the natural environment using a caregiver coaching model consistent with family-centered practices.

**Early intervention providers/ Developmental Specialists.** An early intervention provider and Developmental Specialist is defined in this research as an EI provider in Virginia that does not have the educational endorsements as either a Speech-Language Pathologist or a Teacher for the Deaf/hard-of-hearing, but does have an educational background in child development. EI providers and Developmental Specialists have obtained the required EI certification from Virginia (Infant & Toddler Connection of Virginia, 2011).

**EHDI 1-3-6 Plan.** The Early Hearing Detection and Intervention (EHDI) programs goal is to ensure that every child born in the United States is screened for hearing loss by one month of age, every child with a congenital hearing loss is identified before 3 months of age and provided with appropriate intervention by 6 months of age (National Center for Hearing Assessment and Management, n.d.).

**Joint Committee on Infant Hearing.** The Joint Committee on Infant Hearing (JCIH) is an organization established in 1969 (JCIH, n.d.) comprising representatives from national stakeholders in the area of hearing loss from the fields of audiology, otolaryngology, and pediatrics. The mission of the JCIH is to, “address issues that are important to the identification, intervention, and follow-up care of infants and young children with hearing loss” (JCIH, n.d.).

**Listening and Spoken Language Specialist.** A Listening and Spoken Language Specialist (LSLS<sup>TM</sup>) is defined in this research as a professional having obtained advanced certification through the AG Bell Academy for Listening and Spoken Language as well as meeting the requirements for early intervention certification through the Infant & Toddler Connection of Virginia. These professionals can have a background as a Speech-Language Pathologist, Teacher for the Deaf/Hard Hearing, or an Audiologist.

**Otoacoustic emissions.** Otoacoustic emissions (OAEs) screening is one of two possible physiologic measures used for newborn hearing screening and assessment. A small probe is placed in the ear canal and soft tones or clicks are presented. Sound travels through the middle and inner ear and if the cochlea is functioning normally, an echo is produced (otoacoustic emission). The OAE is then measured by the probe and analyzed by a computer. The equipment will be unable to measure the OAE when there is dysfunction in the middle ear or along the pathway resulting in a ‘refer’ (National Center for Hearing Assessment and Management, 2016).

**Speech-Language Pathologist.** A Speech-Language Pathologist (SLP) is defined in this research as a professional having obtained national certification through the American Speech-Language Hearing Association as well as meeting the requirements for early intervention certification through the Infant & Toddler Connection of Virginia.

**Systems Change Theory.** Systems change theory is a theoretical framework for managing organizational change introduced by Ambrose (1987). It is comprised of a shared *vision*, necessary *skills*, *incentives*, *resources*, and an *action plan*. See *Figure 1* for a graphic detailing this framework.

**Teacher for the Deaf/Hard-of-Hearing.** A Teacher for the Deaf/Hard-of-Hearing (TDHH) is defined in this research as a professional having obtained an endorsement from the Virginia Department of Education in special education - hearing impairments preK-12 as well as meeting the requirements for early intervention certification through the Infant & Toddler Connection of Virginia.

**Train-the-Trainer Model.** The Train-the-Trainer model is an efficient, cost-effective means to provide ongoing professional development for translating interventions from research to practice. The TTT framework comprises training a group of professionals who are in-turn, able to train other groups of professionals.

**Universal Newborn Hearing Screening.** Universal Newborn Hearing Screening (UNHS) is recommended by the World Health Organization (WHO) as a preventive measure for speech-language, cognitive, and educational delays as the result of undiagnosed or late identified hearing loss (WHO, 2010). The WHO (2010) cited the preferred method of identification is through the use of physiologic assessments most notably otoacoustic emissions

(OAEs) or Auditory Brainstem Response (ABR) prior to hospital discharge. In the United States, 98% of all infants are screened for hearing impairment through UNHS (CDC, 2014).

Table 1

*Commonly Used Acronyms*

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<u>Acronym</u>	<u>Meaning</u>
AG Bell	Alexander Graham-Bell Association for the Deaf/Hard-of-Hearing
APR	Annual Performance Report
ASHA	American Speech-Language Hearing Association
CAEP	Council for the Accreditation of Educator Preparation
CCC-SLP	Certificate of Clinical Competence-Speech-Language Pathology-Awarded by ASHA
CEC	Council for Exceptional Children
CED	Council on the Education of the Deaf
EDHI	Early Hearing Detection and Intervention
EI	Early Intervention
IDEA (2004)	Individuals with Disabilities Education Improvement Act (2004)
JCIH	Joint Committee on Infant Hearing
LSLS <sup>TM</sup>	Listening and Spoken Language Specialist (Certified Auditory-Verbal Therapists or Certified Auditory-Verbal Educator; awarded by AG Bell)
LTF	Loss to Follow-up
OCHL	Outcomes of Children with Hearing Loss (Tomblin et al., 2015)
SLP	Speech-Language Pathologist
SSIP	State Systematic Improvement Plan
TDHH	Teacher for the Deaf/Hard-of-Hearing
TTT	Train-the-trainer
UNHS	Universal Newborn Hearing Screening
VA DOE	Virginia Department of Education

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## Chapter II

### **Review of the Literature**

Professionals providing family-centered services in early intervention (EI) have varied educational backgrounds such as Speech-Language Pathologists (SLP), Teachers for the Deaf/Hard-of-Hearing (TDHH), and Developmental Specialists. Understanding the nature of these variances and their potential impacts on service delivery in EI, can have implications for professional preparation and ongoing continuing education of EI providers serving families of children with hearing loss. This chapter begins with an overview of Universal Newborn Hearing Screening (UNHS), the *EHDI 1-3-6 Plan*, and the infrastructure supporting the process from identification to receiving EI services under IDEA Part C (IDEA, 2004). Next, a systematic review of the literature is presented on caregiver coaching as it applies to early intervention, language acquisition, communicating choices, and overall development as a conceptual framework for professional preparation. Finally, professional preparation and continuing education programs for early intervention providers are explored with a focus on caregiver coaching in the context of the *National Agenda: Moving Forward on Achieving Equality for Deaf and Hard of Hearing Students* (2005) and the *VA Part C State Performance Plan/Annual Performance Report* (Infant Toddler Connection of Virginia, 2014).

### **Study Identification Procedures**

Two separate literature searches were completed to identify relevant studies and policy documents. First, studies were identified regarding caregiver coaching in early intervention.

Second, research articles and policy documents relevant to pediatric hearing loss and the *EDHI 1-3-6* model were identified. Each of the study identification processes are described below.

**Caregiver coaching and language study identification.** The studies for this portion of the review were identified using a three-step process. First, relevant studies were identified through computer database searches of *Educational Resources Information Center (ERIC)* via *ProQuest*, *Educational Research Complete (EBSCO)*, and *PsychINFO* using the following search terms as identifiers: *parent coaching\**, *parent participation\**, *family involvement\**, *parent role\**, *parent participation in early childhood education\**, *parent training\**, *parenting education\**, *language development\**, and *language acquisition\**. The *Division for Early Childhood of the Council for Exceptional Children (DEC)* states that parental roles may be assumed by single parents, grandparents as parents, two parents of the same sex, and various combinations differing from the traditional mother-father roles (DEC, 2015). Recent literature in the area of coaching uses the term ‘caregiver’; however, thesauri in search databases continue to use the root term ‘parent’ and was therefore used as the search term. The thesauri identified variations of search terms to determine appropriate vocabulary unique to each database.

Second, the reference lists from identified articles were examined to identify any other relevant articles meeting predetermined inclusion criteria. The title and author lists for articles that appeared to meet criteria were compared to the list of identified studies. If the study was not included in the list of previously identified articles, it was reviewed for inclusion. Third, hand searches of prominent journals in the fields of early childhood education, hearing loss, and speech-language development were completed. These searches included the *Journal of Early*

*Intervention, Volta Review, American Annals of the Deaf, and the Journal of Speech, Language, and Hearing Research.*

***Inclusion criteria.*** The following criteria were used to determine whether a study was eligible for inclusion in the review. First, the study had to be peer-reviewed, published in English, and published in the United States after 1997. The Individuals with Disabilities Education Amendments Act of 1997 (IDEA, No. 105-17, §111 Stat. 37) established the mandate that Part C services be provided in the natural environment, using a caregiver coaching model, to optimize developmental outcomes. It should be noted that services prior to this time could have been implemented in the natural environment using caregiver coaching, but it was not mandated; therefore, 1997 was used as the date of inclusion. Second, the children in the studies were: (a) under the age of 3 years; (b) currently receiving or received EI services through IDEA Part C; and (c) using a caregiver coaching model in the natural environment defined as either the home or a community daycare setting. If a study was conducted in a clinic setting to evaluate carryover of skills from intervention to spontaneous language, it was also included in the review. Participants included the caregiver, child, or early intervention personnel. Third, studies using experimental, quasi-experimental, correlational, single-case, or qualitative research methodologies were included.

***Exclusion criteria.*** Studies were excluded if the child's primary intervention setting was a clinic, hospital, therapy room, or rehabilitation center, and caregiver coaching or language development were not the focus of the study. Also excluded were: (a) studies conducted to assess the efficacy of teletherapy or telehealth; (b) case studies, book reviews, and regional program descriptions; (c) studies that solely focused on children with autism spectrum disorder (unique nature and various communication and cognitive abilities) (Volkmar, 2014); and (d) studies

focused on English Language Learners (thought to have language differences rather than disorders as well as the complicated nature of differential diagnosis of ELL and language delays) (Morrow, Goldstein, Gilhool, & Paradis, 2014). Finally, research articles were also excluded if they primarily targeted children over the age of 3, or those receiving services solely for delays in areas other than language (i.e. physical disabilities).

**Hearing loss, EHDI 1-3-6, and policy documents study identification.** Relevant studies were identified through computer database searches of *Educational Resources Information Center (ERIC) via ProQuest, Educational Research Complete (EBSCO), and PsychINFO* using the following search terms as identifiers: *early hearing detection and intervention\**, *1-3-6 model*, *hearing loss\**, *hearing-impairment\**, *deaf\**, *early intervention\**, *early rehabilitation\**, *professional training\**, *oral deaf education\**, *communication methodologies\** and, *IDEA Part C*. Additional studies, position papers, and websites with current data were located using author searches and by examining the reference lists from the initial group of identified studies.

**Inclusion criteria.** Research studies and papers published in the United States from 1997 to the present were included. Policy position papers from key stakeholders, including national groups of education and healthcare professionals, and caregivers were also included. All included research studies focused on the development of spoken methodologies in children with hearing loss, professional preparation, and the *EDHI 1-3-6* model.

**Exclusion criteria.** Studies and position papers were excluded if they did not address education, healthcare, early intervention, or hearing loss in children in the United States. Articles excluded were those: (a) pertaining to adults who have a hearing loss; (b) published outside of

the United States; (c) addressed tele-therapy or tele-health; and (d) focused on school-age services (IDEA Part B).

### **Theoretical Framework**

The current study uses a pragmatic approach to investigate the differences in early intervention practices of caregiver coaching using both a post-positivist perspective and a constructivist approach. Pragmatism, as a philosophical foundation, stresses a method of scientific practice where knowledge guides methods (Paul, 2005). A pragmatist worldview rejects the premise that qualitative and quantitative approaches are incompatible. Pragmatists opt for the use of a combination of methods in order to best address the research questions; thereby allowing the researcher to develop ‘warranted assertions’ regarding a phenomenon being studied (Dewey, 1941; Johnson, Onwuegbuzie, & Turner, 2007).

**Phase one: post-positivist.** The initial quantitative phase uses a post-positivist foundation through a systematic evaluation of the characteristics of Early Intervention providers and their training in Virginia. Post-positivism believes that evidence can be generated through rigorous and controlled methodology with alternative rival hypotheses being actively sought (Paul, 2005). Post-positivism and its ontology, as well as methods, are consistent with research studies targeting the outcome measures of children who are deaf relative to developing communication skills. In keeping with a post-positivist framework, educational and functional communication outcomes have been measured in quantitative terms and reported in state and national databases (Individuals with Disabilities Improvement Act [IDEIA] P.L. 108-446, 2004; No Child Left Behind [NCLB] P.L. 107-110, 2001; Virginia Department of Education, 2012). However, there is little quantitative research regarding the professionals that provide services for this population. Knowledge generated during phase one are analyzed to develop groupings of EI

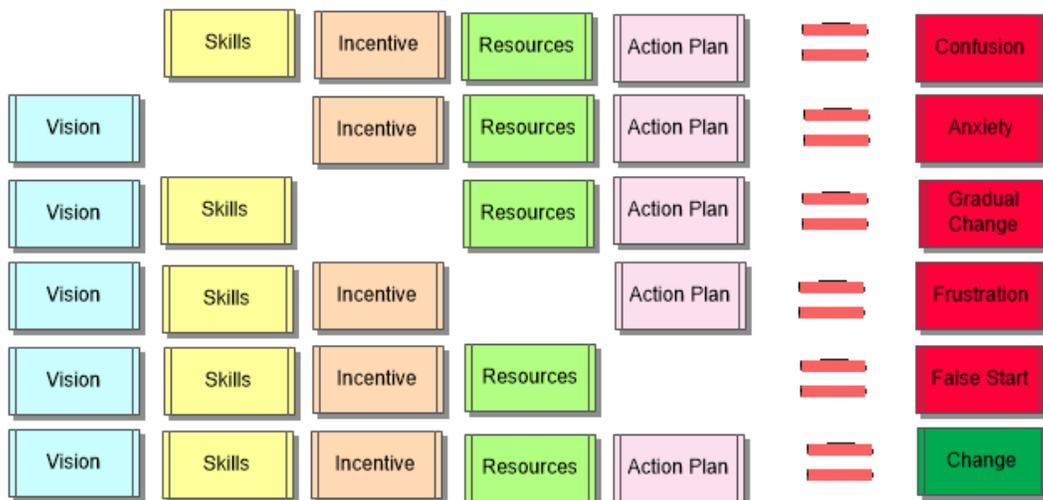
professionals based on their backgrounds, self-reported knowledge of caregiver coaching, and their knowledge of auditory skill development. Each of these groups are represented in the interviews completed in phase two.

**Phase two: constructivism and care theory.** Building on information derived from the first phase, the second phase of qualitative research provides in-depth, rich information regarding the caregiver coaching differences that occur in early intervention sessions with the family. Care theory (Noddings, 2012) serves as a foundation for the qualitative phase. Noddings argued that care is the foundation for ethical-decision making involving a relationship between two people. This relationship is characterized by caring, recognition, and reciprocity built upon the experiences of each person. From a constructivist approach, care theory defines relationships as the way in which people learn and grow, as opposed to merely an individual act (Noddings, 2012). People learn to be cared for, and it is that understanding that leads to them caring about others. The EI provider serves as a coach, or guide, to support the family in refining caregiver-child interactions. Using care theory to study the development of language skills in children with hearing loss, the caregiver would be the ‘carer’ and the child would be the ‘cared-for.’ Similarly, the EI provider would be the ‘carer’ and the caregiver would be the ‘cared-for’ in a caregiver coaching model. Noddings (2012) observed that in the caregiver to young child relationship:

“Only one person can really serve as carer. Reciprocity is then almost entirely defined by the cared-for’s response of recognition. When, for whatever reason (severe illness or handicap, for example), the cared-for is unable to respond in a way that completes the relation, the work of the carer becomes more and more difficult. Carers in this position need the support of a caring community to sustain them.” (Noddings, 2012, p. 54)

For families of children with disabilities, this support comes from an infrastructure comprised of family, friends, medical professionals, and specialists. Knowledgeable EI providers are essential for caregivers who care for a child with a disability, by guiding their interactions with their child. Theoretically, the response of the EI provider to the caregiver impacts the child’s language acquisition (Luterman, 2008).

**Mixed method: Systems change theory and train-the-trainer model.** Systems change theory is a theoretical framework for managing organizational change (Ambrose, 1987). It is comprised of a shared *vision*, necessary *skills*, *incentives*, *resources*, and an *action plan*. Ambrose’s model can be applied to any organizational transition and occurs as part of a voluntary choice involving human perception, cognition, feelings, and each individual’s interaction with organizational variables (Amado & Ambrose, 2001). When one of the five essential parts of the model is missing, the resulting condition is confusion, anxiety, gradual change, frustration, or a false start (Ambrose, 1987). *Figure 1* depicts the Ambrose model for an organizational or systems change.



*Figure 1.* Organizational or systems change using the Ambrose (1987) model.

Systems change theory (Ambrose, 1987) uses defined characteristics where the behavior of each has an effect on the entire system. The parts are interdependent and work in tandem for the stability of the entire system. Each of the characteristics are clearly defined and consistent with post-positivism. However, their relationship and influence on the greater system, including what characteristics are lacking with the subsequent resulting conditions, can only be discovered by using a constructivist lens. By determining the differences in skills among EI professionals who work directly with children who have hearing loss, the researcher has an opportunity to pinpoint what gaps in their training exist. Additionally, qualitative data can give valuable information regarding the experiences of these providers within the broader EI system, consequently facilitating meaningful professional development based on the direct needs of the providers. Qualitative exploration can lead to uncovering the missing pieces from the Ambrose (1987) model in the Virginia EI system.

Once the information from each phase is synthesized and analyzed using Systems Change Theory (Ambrose, 1987), suggestions for the development of a train-the-trainer model (TTT; LaVigna, Christian, & Willis, 2005) can be generated. The TTT model in education serves as an efficient, cost-effective means to provide ongoing professional development for translating interventions from research to practice. The TTT framework comprises training a group of professionals in caregiver coaching, and in auditory skill development, who are, in-turn, able to support EI providers working directly with families of children with hearing loss. The information from this research can be used to determine the greatest areas of need to connect research to practice quickly and efficiently to support caregivers, and influence preservice professional preparation.

## **Universal Newborn Hearing Screening**

Universal Newborn Hearing Screening (UNHS) is recommended by the World Health Organization (WHO) as a preventive measure for speech-language, cognitive, and educational delays as a result of undiagnosed or late identification of hearing loss (WHO, 2010). The implementation of UNHS is a response to estimates of 32 million children worldwide having congenital or early onset hearing loss that greatly affects the acquisition of language (WHO, 2010; 2015). The WHO (2010) released “guiding principles for action” (p. 27) and successful implementation of UNHS based on current practices, in a sample of countries including those with a strong infrastructure and those with a lack of resources. According to the WHO, the preferred method of identification is through the use of physiologic assessments, most notably otoacoustic emissions (OAEs) or Auditory Brainstem Response (ABR). The WHO recommended that all screening efforts should address the clearly stated goals for UNHS programs, with clear roles and responsibilities for those involved, hands-on training for screeners, periodic monitoring of systems, and protocols for how to inform caregivers.

Early Hearing Detection and Intervention (EHDI) grants in the United States, authorized by an amendment to the Public Health Service Act, provided federal funds for states to develop infant hearing screening and intervention programs. The Children's Health Act of 2000 (P.L. 106-310) reauthorized these grants including provisions related to developing and improving the following: (a) early hearing screening; (b) early evaluation of all newborns; (c) coordinated early intervention programming; (d) rehabilitation services; and (e) research initiatives. The United States Congress passed the Early Hearing Detection and Intervention Act of 2010 (P.L. 111-337) authorizing these programs through 2015.

Currently, 98% of all children born in the United States are screened for hearing loss (CDC, 2014) using the preferred methods (OAEs, ABR). According to the Centers for Disease Control and Prevention (2016), the prevalence rate of congenital hearing loss in the United States is 3 per 1,000 infants. Approximately 14.9% of children have a unilateral or bilateral hearing loss that is either congenital or acquired. Between the years of 2005 and 2014, there have been over 45,000 children diagnosed with a hearing loss early as a direct result of the EDHI grants (CDC, 2016), with an increase in the number of infants screened between 2006 and 2012. CDC attributed this increase to progress in the EHDI Hearing Screening and Follow-up Survey (HSFS) which has been operational since 2006.

### **Screening to Intervention**

The US Department of Education maintains state and national databases of the number of infants screened, identified, and referred to Individuals with Disabilities Education Improvement Act (IDEA; P.L.108-446) Part C early intervention services (herein referred to as Part C or EI) through the EHDI state level programs. These programs emphasize detection and identification of hearing loss, as well as the EI practices necessary for speech and language development. Optimal language outcomes for children are obtained when early identification of hearing loss is coupled with quality EI services (Yoshinaga-Itano & Apuzzo, 1998; Yoshinaga-Itano, Sedey, Coulter, & Mehl, 1998; Yoshinaga-Itano, 2014). Optimal EI systems are characterized by an infrastructure of communication between medical and educational providers resulting in a seamless and time-sensitive delivery of services for families. In such a system, children with disabilities can access medical and educational services with a bottom-up approach coupled with service providers and agencies using a child-find mechanism or top-down approach. The effectiveness of the system is not only measured by the number of children who are eligible to

participate in the system, but also by the number of children who are not able to access services or supports (Feinberg et al., 2011; Shapiro & Derrington, 2004; Zirkel, 2015).

**1-3-6 EDHI Plan.** The Joint Committee on Infant Hearing (JCIH) is an organization established in 1969 (JCIH, n.d.) comprised of representatives from national stakeholders in the area of hearing loss. Member organizations include the American Speech-Language Hearing Association (ASHA), American Academy of Pediatrics (AAP), Alexander Graham Bell Association for the Deaf and Hard of Hearing (AG Bell), American Academy of Audiology (AAA), American Academy of Otolaryngology-Head and Neck Surgery, Council of Education of the Deaf (CED), and Directors of Speech and Hearing Programs in State Health and Welfare Agencies. The JCIH is supported by the Centers for Disease Control and Prevention (CDC), Maternal and Child Health Bureau (MCHB), Boys Town National Research Hospital, and the National Institute on Deafness and Other Communication Disorders (NIDCD) of the National Institutes of Health (JCIH, 2015). In 2000, the JCIH released a position statement declaring that all infants should be screened for hearing loss by one month of age, receive appropriate amplification by three months of age, and begin receiving EI services by six months of age to optimize language outcomes. This plan is referred to as the *1-3-6 EHDI Plan* (JCIH, 2000) and is endorsed by the American Academy of Pediatrics (2006), the American Speech-Language Hearing Association (n.d.), and the AG Bell Academy for Listening and Spoken Language (2007).

**Nationally reported data.** The United States maintains state and national databases of the number of infants screened, the number identified with a hearing loss who subsequently received audiological follow-up, and the number referred to EI services under Part C. The Early Hearing Detection Intervention (EHDI) state level programs maintain these databases (CDC,

2013). In 2014, 6,163 infants were identified with hearing loss in the United States through Universal Newborn Hearing Screening with a prevalence rate of 1.6 per 1000 neonates screened (CDC, 2014). Of these infants, 5,419 were referred to Part C EI services, 5,031 were found eligible for services, and 4,000 received EI services through Part C (CDC, 2014). These data indicate almost 20% of children at a high risk for delays in speech-language development did not receive the early intervention services vital for improved long-term outcomes. For the years 2012-2014, there were 11,013 children with hearing loss receiving EI services through Part C as a direct result of UNHS and the EDHI state level programs (CDC, 2012; 2013; 2014).

**State-level data.** In 2014, there were 156 children identified with hearing loss through the UNHS in Virginia (CDC, 2014). Of these, 154 were eligible for Part C services with 66 reported as enrolled in EI through Part C indicating a 56% loss-to-follow-up (LTF). Currently in Virginia 56% of the infants eligible for EI services secondary to hearing loss are not receiving EI services through Part C. Table 2 displays a comparison of the 2006 data to the 2014 data in Virginia. These data reflect the EHDI Hearing Screening and Follow-up Survey (HSFS) that has been operational since 2006 and is completed annually by the state level EDHI programs. The CDC (2016) reported increases in the number of children being identified early with hearing loss between the years of 2006 and 2012. However, this trend is not reflected in Virginia with the numbers of children being identified after screening remaining steady. These data indicate that there is likely not a reporting issue contributing to a disparity in the number of infants receiving services as a reporting issue would follow the national trend. The loss to follow-up for EI services was reported to be 88 children (56% of those identified with a hearing loss). Virginia reported to the CDC the following reasons for not being enrolled in Part C services in 2013: (a) families contacted, but unresponsive; (b) unable to contact; or (c) unknown. Unfortunately, the

2014 data (CDC, 2014) were not delineated, and all 88 children reported as a loss to follow-up were designated as "Parents/Family Contacted but Unresponsive."

Table 2  
*Comparison of Virginia UNHS Data 2006 and 2014*

<b>Data 2006<sup>i</sup></b>							
Screening		Diagnosis		Early Intervention (EI)			
# screened	# not passing	# permanent hearing loss	Loss to follow-up <sup>ii</sup>	Eligible Part C EI	Enrolled Part C EI	Total receiving No EI services	Loss to follow-up <sup>iii</sup>
100,369	2,318	132	486	Not provided	62	39	21
<b>Data 2014<sup>iv</sup></b>							
103,341	3,332	156	467	154	66	0	88

<sup>i</sup> Data from the 2006 Annual Data Early Hearing Detection and Intervention (EHDI) Program

<sup>ii</sup> Referred screening; not diagnosed

<sup>iii</sup> Diagnosed; not enrolled in EI

<sup>iv</sup> Data from the 2014 Annual Data Early Hearing Detection and Intervention (EHDI) Program

The loss to follow-up (LTF) data for Virginia (CDC, 2014) is considerably higher than neighboring states such as North Carolina (LTF = 15.6%) and Maryland (LTF = 7.9%). Reported LTF varies greatly among states with the lowest of the contiguous United States being Delaware, Maine, Vermont, West Virginia, and Wyoming indicating a 0% LTF. When ranked nationally, Virginia has the third highest percentage of loss to follow-up for EI services following South Dakota (78.8% LTF) and Texas (71.4% LTF). In 2008, the American Speech-Language Hearing Association (ASHA) completed a systematic review of the reasons for delays in follow-up after UNHS including:

- funding issues for the state EDHI programs;
- reduced reimbursement for audiology services;
- lack of insurance coverage for hearing aids, cochlear implants, and ear molds;

- lack of caregiver education regarding hearing screening and hearing loss;
- proximity of resources; and
- difficulty identifying professionals with expertise in pediatric audiology and intervention.

**Identifying the gap to services.** In Virginia, there is no direct research to identify the breakdown within the infrastructure of the reporting system that may persist at the state level related to the areas identified by the ASHA 2008 report. Nationally, there are several resources developed for caregivers and professionals aimed at decreasing the loss to follow-up services throughout the screening, identification, and intervention processes. These resources include providing information for caregivers, streamlining data tracking for professionals, implementing national policies for EI services, and implementing caregiver supports in understanding the processes in place.

**Information for caregivers.** A comprehensive website, *Early Hearing Detection and Intervention– Pediatric Audiology Links to Services (EHDI–PALS)*, was published in 2012 by a task force comprised of stakeholders including representatives from the American Academy of Audiology (AAA), ASHA, CDC, Directors of Speech and Hearing Programs in State Health and Welfare Agencies, Early Childhood Technical Assistance Centers funded by the Office of Special Education Programs (OSEP), JCIH, National Center for Hearing Assessment and Management (NCHAM), and State Early Hearing Detection and Intervention (EHDI) Coordinators. The *EDHI-PALS* website contains a directory of pediatric audiology facilities with specialized equipment for completing ABRs and OAEs, licensed audiologists, and hearing aid and cochlear implant services for children under the age of 5 years old. Families of children with hearing loss can input their child’s birthday, their zip code, and desired services to locate

facilities in their area which provide those services. According to the *EDHI-PALS* website, there are approximately 30 pediatric audiology facilities in Virginia with the majority being clustered around Richmond and northern Virginia. The *EDHI-PALS* website houses information on childhood hearing loss, early intervention Part C services, and a comprehensive list of additional websites for national support organizations (EDHI-PALS, n.d.).

**Data tracking.** In Virginia, the results of newborn hearing screenings are reported to the Virginia Department of Health using a web-based system, Virginia Vital Events and Screening Tracking System (*VVESTS*) (Chapman et al., 2011). *VVESTS* integrates the Virginia birth defects registry, newborn hearing screening tracking and management system, and electronic birth certificates into one system that allows for longitudinal data tracking, thereby improving data security and quality. Using de-identified data, health care workers can aggregate the data to conduct needs assessments and plan services for children with disabilities. The Virginia Infant Screening and Tracking System (*VISITS*) created a single record for each infant allowing the Virginia Department of Health (VDH) the ability to provide families with follow-up services. The system progressed until 2010 and intended to minimize the loss to follow-up, expand the referrals to early intervention, improve the mechanism for identifying children with late onset hearing loss, and improve the efficiency of data collection and dissemination (Chapman et al., 2011).

Despite the development of a new system, the previously discussed challenges raised by the ASHA (2008) technical report remain, as evidenced by the loss-to-follow up in Virginia (CDC, 2014), including funding issues for the state EDHI programs, proximity of resources, and difficulty identifying professionals with expertise in pediatric audiology and intervention. Any computerized reporting system relies on audiologists and early intervention offices to accurately

report data for the *1-3-6 EHDI Plan*. Additionally, there must be adequate staffing at VDH to report and use the *VISITS* data.

***Intervention policy.*** Educational policy changes, coupled with state EDHI mandates, created an intersection of advancements in education and medicine that greatly impacted families of children with hearing loss. The Education of the Handicapped Act Amendments of 1986 (P.L.99-457) established early intervention services through Part H (now Part C of IDEA), providing services for infants and toddlers with disabilities or at risk for disabilities from birth to age three. These services, designed for children with delays in the areas of physical, cognitive, communication, social, or adaptive development, improve long-term educational outcomes (Office of Special Education and Rehabilitative Services, 2014). In Virginia, there are questions regarding the accuracy of the data reported to the CDC (2014) when compared to the data from the statewide early intervention database. The Infant Toddler Online Tracking System of Virginia (ITOTS) from the period of December of 2014 to December of 2015 documented a total of 244 children with hearing loss receiving services in the EI system in Virginia. However, this number may not be indicative of the entire number of children receiving services. For example, a child with a primary medical diagnosis of Down Syndrome could be served in the system, have a hearing loss identified through the Universal Newborn Hearing Screening, and not be recorded in the ITOTS as having a hearing loss due to their other medical issues.

***Caregiver supports.*** In previous years, Virginia used a program titled Guide By Your Side (GBYS™), primarily staffed by caregiver volunteers, to reach families of infants newly identified with hearing loss and connect them to resources, including early intervention, and worked collaboratively with VDH to track follow-up services. GBYS™ (2008) is a program developed by a national organization called Hands & Voices™ aimed at providing emotional

support and unbiased communication options information from trained Parent Guides. However, for a state to use the GBYS™ program there is a requirement for a state chapter of Hands & Voices™. Thus, shortly after Virginia's state chapter dissolved, the GBYS™ program was no longer available.

### **Measurable Outcomes in Children with Hearing Loss**

Currently, in the United States, researchers are concerned with identifying the moderating factors that influence long-term educational and functional outcomes for children with hearing loss. There is one longitudinal study with outcome measures for children with hearing loss (OCHL) in the United States (Harrison et al., 2016; Tomblin & Moeller, 2015; Tomblin et al., 2015). Additionally, Gallaudet's Annual Survey of all children in the educational system details demographic data nationally (Gallaudet Research Institute, 2010). The National Institute on Deafness and Other Communication Disorders (NIDCD) compiled data to determine variables that moderate positive outcomes of children who are deaf or hard of hearing (Eisenberg et al. 2007).

**Longitudinal study of outcomes.** The *Outcomes of Children with Hearing Loss Study* (OCHL; Tomblin et al., 2015) is a multicenter, multidisciplinary five-year study in the United States documenting language and auditory outcomes during the period from infancy to school-age using comparison data for children with normal hearing. The primary goal of the OCHL study is to investigate the long-term language and auditory outcomes of children with congenital bilateral, mild-to-severe hearing loss. Additionally, the researchers aim to identify the factors that moderate the relationship between hearing loss and longitudinal outcomes. These measures are intended to answer the unanswered questions regarding what are the best practices of how to educate children with hearing loss by examining variations in performance.

The children with hearing loss included in the study had mild-to-severe hearing losses (25 – 75 dB HL), did not have a cochlear implant, lived in homes where English is the primary language, and did not present with any cognitive or motor delays. The severity and age of onset of hearing loss functioned as the principal health risk factor with clinical interventions and background characteristics functioning as moderators. There were 317 participants who had mild-to-severe hearing losses (25 – 75 dB HL) and 117 participants with normal hearing (i.e. four frequency pure-tone averages  $\leq$  20 dB HL bilaterally). The constructs measured included speech perception, speech sound production, language development, pre-reading, spelling, math, general intelligence, social cognition (i.e. theory of mind), and service provision.

Tomblin and Moeller (2015) presented an overview of the study with overall structure of how findings were disseminated through nine articles published in 2015. McCreery et al. (2015) specifically addressed auditory skill development as measured through caregiver questionnaires and word recognition measures. Questionnaires included *LittleEARS Auditory Questionnaire*, *PEACH* (Parents' Evaluation of Aural/oral performance of Children) rating scale, and Speech, Spatial, and Qualities of Hearing Scale (SSQ). The three measures of auditory skill development used by the researchers rely solely on caregiver report of observations of skills such as environmental sound awareness, word recognition, listening in noise, and overall auditory functioning. Other than the use of single word recognition tests completed by an audiologist, there were no direct assessments by professionals of auditory skill development consistent with the models of development proposed by Erber (1982), Ling (1988), Pollack (1970), or Walker (2009). Therefore, any dynamic assessment measures regarding longitudinal development of auditory skills in discourse completed by professionals trained in the development of auditory skills were not included as part of the study.

**Gallaudet's Annual Survey.** Gallaudet University's Research Institute collects demographic, audiological, and educational data from across the country through the *Annual Survey of Deaf and Hard of Hearing Youth and Children*. The most recent survey results available are from the 2009-2010 school year with pertinent data for Virginia as compared to the nation (e.g. see Table 3). The children targeted in the study ranged in age from under 3 years old to 18 years old or older. All of the school-age children attended public schools. The children under age 3 are those enrolled in public school preschool programs or specialty centers. Hence, nationally there are only 450 children under the age of 3 represented as most of these children are provided services in EI programs. Survey information indicated the majority of children with hearing loss were born to parents with normal hearing (77%) and utilized spoken language (53%). However, auditory development services (Auditory Verbal Therapy) were not provided to the children. This lack of services can either be explained by: (a) the children did not require the services; (b) the services were not available due to a lack of professional training despite having adequate staffing; or (c) the critical shortage of professionals in the field. It is important to note there continues to be a gap in the use of sign language by students at school (27.4%) and the use of sign in the home environment (5.8%). The large gap between the school and home environments indicates that families who are choosing sign language for their children are also at a disadvantage, as they are not learning sign to communicate with their children. Overall, there are challenges for children and families with hearing loss across communication modalities which includes access to the preferred communication modality, language, and services regardless of communication choice.

Table 3

*Demographic Information from the Gallaudet Research Institute Annual Survey of Children*

Area of Interest	Virginia		United States	
	<i>n</i>	percentage	<i>N</i>	percentage
Total number of children	1199	100%	37828	100%
Children born to parents that each have normal hearing	950	80.6%	28533	77%
One parent has a hearing loss	54	4.6%	1515	4.1%
Both parents have a hearing loss	14	1.2%	1314	3.5%
Receive classroom instruction in sign language	55	6.9%	4158	21.9%
Classroom setting – general education setting with hearing peers	663	65.6%	15598	57.1%
Classroom setting – special or center school	212	21%	6644	24.3%
Classroom setting – self-contained classroom in the general education school	304	30.1%	6205	22.7%
Receive itinerant services from a TDHH	483	60.3%	7877	41.5%
Receive Speech-Language services	423	52.8%	11141	58.7%
Receive Oral/Aural (AVT) services	12	1.5%	725	3.8%
Use spoken language only for instruction	806	68.6%	19805	53%
Use spoken language with cues for instruction	64	5.4%	932	2.5%
Use sign language only for instruction	179	15.2%	10228	27.4%
Homes do not use sign language	941	82.3%	26115	71.6%
Homes use ASL	33	2.8%	2144	5.8%

**Variance in Outcomes.** In 2006, a workgroup from the National Institute on Deafness and Other Communication Disorders (NIDCD) compiled a list of potential sources of variance

moderating positive outcomes of children who are deaf or hard of hearing (Eisenberg et al. 2007). Caregiver interaction strategies, skills of the provider, and auditory experience were considered significant moderating factors directly related to the language and academic outcomes of children with hearing loss. The workgroup suggested this is an area requiring further research. Additionally, the workgroup listed outcome domains comprising fifteen areas, for several age ranges including birth to three years. Auditory skill development was the area of development listed first, signaling the importance of research in auditory skill development. The workgroup briefly mentioned the importance of studying the skills of the provider and the need for quality programs, but did not articulate what skills might be relevant or how they related to knowledge of auditory skill development.

### **Shifts in Early Intervention**

The Individuals with Disabilities Education Act of 1990 (IDEA, P.L. 101-476) initiated a challenge for EI programs to provide services to infants and toddlers with developmental delays or disabilities in the child's natural environment, consistent with research in early intervention demonstrating improved outcomes in these settings with family-centered quality care (Adams & Tapia, 2013; IDEA, 1990; IDEA 1997). Prior to 1990, services were provided across a variety of settings based on programmatic convenience. Providing services in the natural environment (i.e. home or daycare setting) has facilitated the emergence of caregiver coaching as a method of increasing the capacity of caregivers to impact language development and meet other needs of the child.

**Caregiver coaching.** Caregiver coaching consists of strategies used by EI professionals to enlist the caregiver as a partner in the process of facilitating the child's development, and builds the caregivers' capacity to implement language-enhancing strategies within the natural

environment (Roberts & Kaiser, 2011). To illustrate, Dinnebeil (1999) discussed caregiver coaching relative to intended outcomes of the services provided, and purported that the actual process of learning for both the child and the caregiver comprised a portion of those intended outcomes.

***Learning theory.*** Models of learning, traditionally applied to the classroom setting, have been adapted to the caregiver coaching paradigm (Bredekamp & Rosegrant, 1992; Dunst & Trivette, 2009; Haring, Lovitt, Eaton, & Hansen, 1978). One example is the learning cycle presented by Bredekamp and Rosegrant (1992) which reflected a constructivist foundation consisting of four distinct stages: *awareness, exploration, inquiry, and utilization*. These stages progress from concrete conceptualization to a personal understanding. *Awareness* is when the learner is exposed to new concepts and ideas. *Exploration* involves having opportunities to interact with new ideas and concepts on a personal level. During *inquiry*, the learner must be supported in their efforts to master new material. Finally, in the *utilization* stage, learners are able to use their skills in real-world situations. The learning cycle model is cyclical in that it repeats with each new skill introduced.

In contrast, the learning hierarchy from a behavioral approach (Haring et al., 1978) has been applied to adult learning in early intervention (Dunst & Trivette, 2009). The process of learning with a behavioral foundation includes *acquisition, fluency, maintenance, and generalization*. The *acquisition* stage involves learning a new skill to a predetermined level of competence. *Fluency* occurs when the learner practices the learned skill until implemented with accuracy and ease. *Maintenance* occurs with repeated opportunities to practice, so that the skill will endure over time. *Generalization* occurs when the learner can perform a learned skill across a variety of places, cues, people, and materials. Regardless of the paradigm to which an early

interventionist subscribes, each model ends with the same goal: independence of language facilitation skills in everyday events.

***Stages of family-centered practice/coaching.*** Friedman, Woods, and Salisbury (2012) recognized the need to define the strategies used by EI practitioners, thus initiating the conversation about strengthening the capacity of caregivers to provide developmentally appropriate services. In doing so, Friedman et al. (2012) detailed four stages of the caregiver-coach interaction with related coaching strategies in each stage. The framework detailed below reflects family-centered practice as well as adult learning models.

*Stage one: setting the stage.* During Stage One of interaction, the caregiver and coach develop their relationship. The caregiver provides updates regarding the child or family, and the two participants (caregiver and provider) share information and prepare for the session. Stage one incorporates four caregiver coaching strategies: conversation and information sharing, observation, direct teaching, and demonstrating. *Conversation and information sharing* is used throughout the session and is bidirectional between participants. Throughout the session, this time is used to share and build on information about the child (e.g. when the child is helping the caregiver with a chore, the coach can ask about other chores the child performs). *Observation* occurs throughout the visit. The caregiver and child interact while the provider observes the interaction. During this time, the coach generates ideas on how to embed the goals of the Individualized Family Services Plan (IFSP) into the routine. This period is more incidental in nature with the coach looking for carryover from previous sessions of specific skills taught and practiced during previous stages into natural interactions. *Direct teaching* (of the caregiver) occurs when the coach intentionally scaffolds the caregiver's knowledge acquisition by providing print, verbal, visual, or video information. Information is individualized for the

caregiver as well as the needs of the child. *Demonstrating* occurs when the coach narrates what he or she is doing while modeling a skill for the caregiver; thereby giving the caregiver an opportunity to watch the use of a strategy while in action.

*Stage two: application opportunities and feedback.* Stage Two consists of the caregiver practicing in context with support, discussion, and feedback from the coach. The coach's role is to support the interaction between the caregiver and the child. Friedman et al. (2012) defined stage two as comprising guided practice with feedback, caregiver practice with feedback, and joint interaction. During *Guided Practice with Feedback*, the caregiver attempts a strategy with the child while the coach offers specific suggestions within the context of the routine. *Caregiver practice with feedback* presents as a reduced hands-on role of the coach with an emphasis on the caregiver performing independently. This is an opportunity for the coach to gather performance data regarding the caregiver's specific targeted skills. The caregiver is the child's primary communication partner, and this part of stage two is designed to increase the caregiver's confidence in facilitating communication growth. In *joint interaction*, the coach and caregiver work as partners with the child. They may take turns interacting with no performance feedback.

*Stage three: mastery.* Stage Three occurs when the caregiver generalizes strategies across various settings while problem-solving to promote child learning across situations. The only coaching strategy within Stage Three is problem solving and reflection. *Problem-solving and reflection* allow the caregiver to report difficulties in everyday experiences. The coach listens to these concerns and guides the caregiver through a problem-solving process. Examples include asking the caregiver what worked well in a session, discussing how the session can be improved, or brainstorming ways to incorporate strategies into new routines.

*Stage four: no coaching.* Stage Four occurs when the coach is working directly with the child, and the strategies include child-focused and ‘other’. With the *child-focused* strategy, the coach works directly with the child to elicit multiple IFSP outcomes without interacting with the caregiver. *Other* refers to the caregiver and coach discussing topics unrelated to the child or family, i.e., social conversation.

Regardless of the stage at which the caregiver-coach relationship functions for any given point in time, the ultimate goal for children with hearing loss continues to be the acquisition of language. The strategies described above function as vehicles for attaining IFSP goals. Caregiver coaching stages examined through the lens of language acquisition can inform current practice and policy for children with hearing loss (Barker et al., 2013).

**Language acquisition in family-centered intervention.** Caregivers work directly with EI service providers in the natural environment to maximize carryover of language goals throughout the day and to facilitate language acquisition essential to improving long-term educational outcomes that are critical for children with disabilities. Language development or acquisition refers to the process of learning to communicate. It involves comprehension and expression of the language of the home environment (Harris, 2002). Traditionally, language development is measured through standardized assessments, systematic language samples, or dynamic assessments laying the foundation for intervention based on a child’s strengths and weaknesses (Harris, 2002). Using research-based practices to facilitate language development, caregivers work with early interventionists to help their children who, because of their hearing loss, are at high risk of not developing expressive language comparable to their same-age peers. This supports the *1-3-6 EDHI Plan* by optimizing language, social, and academic outcomes (JCIH, 2007; Yoshinago-Itano, 2014).

***Language acquisition strategies.*** Friedman et al. (2012) defined caregiver coaching by using the *Home Visiting Observation Form* (HVOF). The researchers defined nine EI behaviors resulting in positive impacts on development including: (a) *conversation and information sharing*; (b) *observation*; (c) *direct teaching*; (d) *demonstrating*; (e) *guided feedback and practice*; (f) *caregiver practice with feedback*; (g) *joint interaction*; (h) *problem solving/reflection*; and being (i) *child-focused*.

DesJardin (2005) furthered the research of facilitative language techniques by identifying and defining higher or lower level strategies used within EI sessions for children with hearing loss. Lower level techniques facilitated language for children at the one-word stage of development. These included *labeling, linguistic mapping, closed-ended questions, imitation, commenting, and directives*. In contrast, higher level techniques facilitated development in children at the three-four-word stage of language development such as *parallel talk, expansion, recasting, and open-ended questions*. Techniques are effective on their own, but must be used appropriately to facilitate language. For example, using open-ended questions such as “What do you want to drink” with a child who is learning the beginning “Wh” question form is not as effective as giving the child choices such as, “Do you want juice or milk to drink.”

Barton, Chironis, and Moore (2014) completed standardized assessments as well as language samples with eight caregiver-child dyads. Through these samples, they identified nine caregiver coaching strategies including *responsivity, target level talk, questions, expansions, verbal mapping, incidental teaching, modeling, and forced choice*. They also found that following caregiver coaching, caregivers improved all targets immediately, and *target level talk* maintained as per observations at three months post- intervention, while *responsivity* did not

maintain. However, *questioning*, a low-level language facilitation technique, remained high after initial desired decreases.

Table 4 presents caregiver coaching strategies and language acquisition strategies with subsequent results, as described in a review of studies addressing caregiver coaching in early intervention. Descriptions of caregiver coaching and language facilitations strategies contained in the literature reviewed included *closed or open ended questions* ( $n = 5$ ), *modeling* ( $n = 5$ ), *parallel talk* ( $n = 5$ ), *expansion* ( $n = 5$ ), *linguistic mapping* ( $n = 4$ ), *responsivity* ( $n = 4$ ), *waiting* ( $n = 3$ ), *imitation* ( $n = 2$ ), *commenting* ( $n = 2$ ), *observing* ( $n = 2$ ), *forced choice* ( $n = 2$ ), *recasting* ( $n = 1$ ), *labeling* ( $n = 1$ ), *directives* ( $n = 1$ ), *direct teaching* ( $n = 1$ ), and *turn-taking* ( $n = 1$ ). These strategies are not relegated to one specific stage within the caregiver coaching model presented by Friedman et al. (2012), but integrated into the dynamic structure of the coaching relationship based on the needs of the child.

Table 4

*Caregiver Coaching and Intervention Strategies with Subsequent Results*

<u>Study</u>	<u>Caregiver Coaching and Intervention Strategies</u>	<u>Results</u>
McBride & Peterson (1997)	Role of the interventionist: 1. Direct teaching 2. Providing information 3. Transition of topic	Less than 1% of the time was spent on modeling techniques or coaching caregivers. When a more liberal definition of modeling was applied, the percentage of occurrence increased to 32%.
Yoder et al. (2001)	Acknowledgements of linguistic and nonlinguistic responses	Linguistic mapping to intentional communication related to expressive language 12 months post intervention Linguistic mapping to intentional comm. related to receptive and expressive language 6 months post intervention Maternal responses to intentional communication are predictors to later child communication and language Linguistic mapping to intentional communication: predicted later receptive and expressive language
Woods, Goldstein, & Kashinath (2004)	1. Descriptive praise 2. Gestural or visual cues 3. Modeling 4. Imitation 5. Presenting choices 6. Expansion 7. Open-ended questions 8. Waiting	Multiple-baseline across participants design and across caregivers Increased the use of target strategies in the intervention condition.
Campbell & Sawyer (2007)	Role of the interventionist: 1. Observing 2. Directing 3. Facilitating	Differences between participation-based and traditional services and role of home visitor between groups: Role of Visitor: Sensitive directions ( $d = .99$ ) Sensitive facilitation ( $d = .82$ ) Insensitive interaction ( $d = .47$ ) Role of the caregiver: Watching ( $d = .89$ ) Not being involved ( $d = .74$ )
Peterson et al. (2007)	1. Asking/answering questions 2. Listening 3. Observing 4. General Conversation	Actual time spent on caregiver coaching was much less than the providers perceived with less than 1% dedicated to coaching caregiver-child interactions and modeling for caregivers combined.

DesJardin (2011)	<ol style="list-style-type: none"> <li>1. Parallel talk</li> <li>2. Expansion</li> <li>3. Recast (repeating what child said)</li> <li>4. Open-ended questions</li> <li>5. Labeling</li> <li>6. Linguistic mapping (saying child's intended message)</li> <li>7. Closed-ended questions</li> <li>8. Imitation</li> <li>9. Comments</li> <li>10. Directives</li> </ol>	<p>Pearson product correlations showed: Positive relationships with self-efficacy items:</p> <ul style="list-style-type: none"> <li>• recast (<math>r = 0.48</math>; <math>p &lt; .05</math>)</li> <li>• open ended questions (<math>r = 0.38</math>; <math>p &lt; .05</math>)</li> <li>• closed-ended question (<math>r = 0.46</math>; <math>p &lt; .05</math>)</li> </ul> <p>Negative relationship:</p> <ul style="list-style-type: none"> <li>• directives (<math>r = -0.57</math>; <math>p &lt; .01</math>)</li> </ul> <p>Mother's use of higher level language facilitation techniques associated with advanced development of children's language skills.</p>
Roberts and Kaiser (2011)	<ol style="list-style-type: none"> <li>1. Responding to child communication</li> <li>2. Increasing quality of linguistic input</li> <li>3. Adjusting balance of adult-child communication</li> <li>4. Expanding or recasting the child communication</li> </ol>	<p>Results: effect sizes ranged from <math>g = .35</math>, <math>p = .02</math>, 95% confidence interval (CI) [0.37, 0.65] for receptive language to <math>g = .82</math>, <math>p &lt; .01</math>, 95% CI [0.37, 1.38] for expressive language</p>
Friedman et al. (2012)	<ol style="list-style-type: none"> <li>1. Conversation and Information Sharing</li> <li>2. Observation</li> <li>3. Direct Teaching</li> <li>4. Demonstrating</li> <li>5. Guided Feedback and Practice</li> <li>6. Caregiver Practice with Feedback</li> <li>7. Joint Attention</li> <li>8. Problem Solving</li> </ol>	<p>Coaching strategies accounted for a small portion of session intervals before professional development.</p> <p>Caregiver coaching strategies were not documented at all before professional development and increased to 15% of session afterward.</p>
Roberts & Kaiser (2012)	<p>Caregiver implemented EMT (Enhanced Milieu Teaching)</p> <ol style="list-style-type: none"> <li>1. Context for communication</li> <li>2. Modeling and expanding</li> <li>3. Time delay strategies</li> <li>4. Prompting strategies</li> </ol>	<p>Following the intervention, Language Intervention group had higher matched turns, responsive feedback, use of language targets, expansions, and prompting after controlling for initial levels of these over the control group.</p>

***Language acquisition and caregiver coaching.*** Project ASPIRE (Sacks et al., 2014) was funded by the US Department of Education, Institute of Educational Sciences. The researchers developed a general EI caregiver education model with the aim of shaping caregiver behaviors to increase linguistic feedback. Measurements were taken pre-and post-intervention (i.e. caregiver education programs) on the number of words spoken to the child, conversational turn-taking opportunities, and the expressive language used by the child regarding mean length of utterances (MLU). Results showed a statistically significant increase in child word count with an increase from 124 vocalizations per hour at baseline to 177 vocalizations per hour following intervention ( $p < 0.05$ ). There was also an increase in child conversational turns from baseline of 32 turns per hour to 49 turns per hour after intervention ( $p < 0.01$ ). The difference in adult word count pre- and post-intervention approached statistical significance ( $p < 0.1$ ) with an increase of 20% between baseline and post-intervention measures. This pilot study supports further investigation of using a quantitative approach to measuring linguistic feedback to increase caregiver conversation as a gateway to gains in overall language skills of children with hearing loss. Caregiver coaching is an on-going and iterative process that is individualized to the family (Friedman et al., 2012). Project ASPIRE is a first step in developing a formal caregiver education program comprised of language enhancing techniques for children with a hearing loss learning spoken language (Sacks et al., 2014). However, it did not address if EI providers with varied backgrounds are giving this same information to caregivers without the use of the scripted videos and training, or if this same training was included in their professional preparation programs.

### **Family-Centered Practice and Communication Choices**

The term “family-centered practice” refers to the way that professionals support families of children with disabilities, and is comprised of four core beliefs (Dunst, 2002): (a) the family is

the stabilizing factor in the child's life; (b) the family is in the best position to determine the needs of the child; (c) the child is best supported when professionals help the family by providing information to meet their needs; and (d) family choice and decision making in service provision are accomplished by empowering families in the decision-making process. These beliefs are essential to the development of supportive relationships between the caregiver and the early intervention provider (Dunst, 2002).

However, the education of children with hearing loss has been fraught with controversy related to its history, the impact of medical advancements, and changes in special education policy. Philosophical debates regarding how children with hearing loss should be taught language have continued since the beginning of the 20<sup>th</sup> century when inventors such as Alexander Graham Bell began his research into hearing and speech science. Briefly examining the historical context of Deaf culture and oralism emphasizes the importance of professional preparation, caregiver choice in communication using family-centered practice, and the support needed for families.

**Early history of D/deaf education: residential schools and oralism.** The history of D/deaf education in the United States gained notoriety from the highly publicized relationship between teacher Anne Sullivan and her most famous pupil - Helen Keller (1887). However, the opening of residential schools for the Deaf signaled a radical shift in the education of children with disabilities. Deaf culture is denoted with a large D indicating the members of the Deaf community who share a rich history, social beliefs, and use sign language as their primary mode of communication. Before these institutions opened, people who were deaf received an education within their homes, and most did not obtain any formal education. Thomas Gallaudet founded the *Connecticut Asylum for the Education and Instruction of Deaf and Dumb Persons* [sic] where

a silent method of teaching was used (vanDrenth, 2003). The training of individuals to work with students who were Deaf continued to be refined as residential schools grew in popularity. Gallaudet's teaching and research gave a voice to the culture surrounding people with a permanent hearing loss who had been oppressed, hidden from society, and forgotten (vanDrenth, 2003).

Teachers who taught using spoken language options were doing so at day schools or home programs throughout the country rather than in residential facilities. Subsequently, in 1868, the Clarke Institution was opened in Northampton, Massachusetts as both a training facility for teachers as well as a school for children who were deaf to learn spoken language. Alexander Graham Bell opened a training program for teachers to work with children using oral methods in 1872 and by 1873 his program was housed in Boston University. In 1884, there were five oral schools in the United States, and by 1900 the number had grown to 45 (vanDrenth, 2003).

Urbantschitch (1895) described the potential for Deaf children to learn to listen, and conceptualized the idea that spoken language was a possibility (Estabrooks, 2012). Alexander Graham Bell's scientific inquiries, as well as his experiences as an oral teacher for the deaf, laid the foundation for the advent of the hearing aid in the 1940s. The invention of the hearing aid single-handedly advanced the research on how students who are deaf can learn to hear phonemes, and discriminate the differences between them, thereby acquiring spoken language and literacy through traditional methods used by the hearing population. Ling (1988) documented in detail, through formal and informal research methods, the teaching methodologies and developmental sequences which proved to be successful in teaching children who were deaf to listen and speak. *Speech and the Hearing-Impaired Child: Theory and Practice*

(Ling, 1988) continues to serve as a roadmap for speech and language instruction using auditory skill development. Pollack (1970) stated eight guiding principles which are still used today by Listening and Spoken Language Specialists specializing in spoken language outcomes and literacy (AG Bell, 2007). Spoken methodologies such as Auditory-Verbal, Auditory-Oral, and Cued Speech have grown in popularity and are now considered viable options for the education of children who are deaf.

**Decision making.** Caregivers of children newly diagnosed with a hearing loss are faced with medical and educational decisions while simultaneously handling their own emotions of grief (Kurtzer-White & Luterman, 2003). Prior to UNHS, children were identified with hearing loss after their caregivers were able to observe their development and form their own conclusions prior to receiving a medical diagnosis (Vohr et al., 2001). UNHS changed the timeline of diagnosis from 3 years to 3 months (Suskind, 2015) thereby accelerating the decision-making process regarding medical management of hearing loss, communication choices, and educational services. Options for the communication mode they want their child to use include: (a) listening and spoken language options (auditory-verbal and auditory-oral); (b) total communication (spoken language and a sign-based system); (c) cued speech (hand movements with mouth shapes); (d) signed exact English (sign in English word order); or (e) American Sign Language (Schwartz, 2007; Sheetz, 2012).

Schwartz (2007) outlined communication options available to children with hearing loss with professional as well as caregiver perspectives regarding each option in an effort to educate parents regarding options without bias. When given all options and unbiased information, more than 85% of caregivers choose spoken language options for their children with hearing loss

without initiating visual systems for communication (Alberg, Wilson, & Roush, 2006; Anderson & Madell, 2014).

**Research in communication options.** While providing unbiased information regarding communication options is optimal, Decker, Vallotton, and Johnson (2012) found that caregiver choices were influenced by professionals and their results suggested that caregivers internalize the opinions of the professionals. Using a web-based survey with 36 participants, Decker et al. (2012) found that caregivers who chose to use spoken communication methodologies only, received information about communication options from teachers ( $M = .6111$ ;  $SD = .502$ ), as well as SLPs and audiologists ( $M = .889$ ;  $SD = .323$ ) more than those who chose to use sign (teachers,  $M = .267$ ;  $SD = .458$ ; SLPs/audiologists,  $M = .533$ ;  $SD = .516$ ). Sources of influential information from both groups included: (a) medical professionals; (b) friends and family members; (c) other parents; (d) teachers; (e) audiologists and SLPs; (f) adults who are D/deaf; and (g) the internet. However, the most influential sources of information noted by caregivers, regardless of communication methodology, were their own judgment and that of their partner/other caregiver. This study did not delineate between caregivers who are hearing versus caregivers that also have a hearing loss regarding their choices or where they seek support.

Fitzpatrick et al. (2016) conducted a systematic review of the literature to compare the effectiveness of sign language to spoken language methodologies for children with permanent hearing loss. The researchers examined peer-reviewed articles using quantitative designs published from 1995 – 2013 with outcomes in auditory skills, vocabulary, speech production, and language. Eleven studies met the criteria for the study. The researchers concluded there was insufficient high-quality evidence to support the use of sign language in combination with spoken language as being more effective than spoken language alone, noting substantial

evidence that children with hearing loss can develop spoken language through audition, but with no clear consensus regarding an optimal language intervention for these children. Caregiver choice regarding communication options, consistent with family-centered practices, becomes essential when there is a lack of evidence for any one preferred communication methodology resulting in better outcomes.

### **Professional Preparation**

Hearing loss is considered a low-incidence disability (White, 2006) and the number of professionals specifically trained to address spoken language outcomes in children does not meet the demand for these services (Dornan et al., 2010). EI professionals must have knowledge of cognitive, speech, language, and auditory skill development when working with children who have a hearing loss (Houston & Perigoe, 2010). Early intervention providers use coaching to transfer their professional knowledge to caregivers, thus supporting them to make informed decisions regarding communication methodologies for their children who are deaf (Crowe et al., 2014; Estabrooks, 2012; Hanft, Rush, & Shelden, 2003; Rice & Lenihan, 2005; Scheetz, 2012). The following section addresses the state of professional training including: (a) university training programs in United States and in Virginia; (b) required state and national certifications and licensures; (c) caregiver and professional perspectives regarding professional training; and (d) continuing education programs for professionals.

**University training programs for teachers of the Deaf and Hard-of-Hearing.** There are currently 64 collegiate D/deaf education programs in the United States, one of which is Virginia's program located at Radford University (DeafEd.net and Hands & Voices, n.d.). Of these 64 programs, 13 offer graduate degrees which have a concentration in oral (verbal

language) teaching methodologies, Virginia's training program at Radford University is not among them (oral deaf Education, n.d.).

Dolman (2008) documented changes in coursework over a 20-year period in undergraduate teacher training programs for TDHH and compared information from Dolman's previous research collected in 1986. The number of training programs for TDHH decreased by almost 30% over the 20-year period studied. There have been tremendous advancements in hearing technology over the past 20 years such as the use of cochlear implant technology by children 12 months of age or younger leading to more spoken communication users. However, Dolman (2008; 1986) documented that 63% fewer universities required their undergraduate students to have a course in speech and hearing anatomy, 37% fewer programs required a course in teaching speech to children who are deaf, and 15% fewer required a course in aural habilitation in 2008 versus 1986. Basic knowledge in speech and hearing, spoken communication, and aural habilitation are essential to teaching children who are DHH using spoken methodological approaches (Houston & Perigoe, 2010). Given that 52% of children with a hearing loss are using speech as their only mode of communication (Gallaudet Research Institute, 2010), training programs are not adequately preparing teachers to provide services to these children.

**Radford University.** Radford University offers an undergraduate Bachelors of Science degree in *Interdisciplinary Studies with Virginia Licensure in Hearing Impairment PreK-12* and Masters of Science degree in *Special Education with Virginia Licensure in Hearing Impairment PreK-12*. Additionally, Radford offers a *Licensure only (grant program) with Virginia Licensure in Hearing Impairment PreK-12*. The undergraduate program offers a language development course, but there is not a specific course for speech development, speech and hearing science, or

auditory habilitation. There are four required courses in American Sign Language. The Masters level program offers a course in Audiologic Assessment and Intervention with a one-day workshop on the development of auditory skills as part of the three-credit course, but does not offer any of the other required coursework (Radford University, 2016).

In order to graduate from Radford with one of the degrees offered, students must pass the *Virginia Communication and Literacy Assessment* and *Praxis I* as required by VA DOE. Students must also pass a *Sign Language Proficiency Interview* involving a one-on-one conversation between the student and interviewer. The interview is recorded and then independently rated to ensure graduates are highly-skilled sign language users (Radford, 2016).

Additionally, a teaching internship is required in either preschool/elementary or secondary instruction leading to Prek-12 state licensure. The requirements do not include courses addressing caregiver coaching, auditory skills, aural habilitation, or speech sciences. Considering the early screening, identification, and intervention priorities of the *1-3-6 EDHI Plan*, the quality of the deaf education teacher program in Virginia is questionable, requiring research to advocate for improved training opportunities for the needs of children served through both IDEA Part C and Part B.

**University training programs for Speech-Language Pathologists.** Currently, there are six graduate programs in Virginia offering degrees in Speech-Language Pathology with accreditation by the American Speech-Language Hearing Association (ASHA). Due to the unique overlap of medical advancements and deaf education, Speech-Language Pathology programs may offer additional training in spoken methodologies beyond the ASHA standards, but it is not required to obtain national certification by the American Speech-Language Hearing Association (ASHA, n.d.). Only five Audiology programs and six Speech-Language Pathology

programs, nationally, incorporate spoken methodologies into their rigorous training programs, and none are in Virginia. Carney & Moeller (1998) identified the critical role that the SLP contributes to the development of spoken language in children with hearing loss. Overall, there continues to be a shortage of SLPs nationally as well as a shortage of SLPs qualified to provide services to this population (ASHA, n.d.; Cosby, 2009.).

### **Certifications and Licensures**

Professionals working with families and children who are deaf or hard-of-hearing have professional backgrounds, leading to certifications or licensures, supported by state departments and national organizations. These include: (a) American Speech-Language Hearing Association (ASHA); (b) Council for Exceptional Children; (c) AG Bell Association for the Deaf and Hard of Hearing; and the (d) Virginia Department of Education. Table 5 summarizes the necessary standards needed for professionals according to a supplement to the JCIH 2007 position statement (Muse et al., 2013) and the Outcomes of Children with Hearing Loss longitudinal study (Harrison et. al, 2016; Tomblin et al., 2015; Tomblin & Moeller, 2015). The requirements for academic programs, certifications, and licensures for each of the organizations that meet these standards are displayed in Table 5.

Table 5

*Essential Skill Areas Aligned with Professional Preparation Program, Certification, and Licensure Requirements*

<b>Skill Areas</b>	<b>ASHA</b> Professional Preparation Standards (CCC-SLP)	<b>CEC</b> Initial Standards for Professional Preparation -align with CAEP (CED Cert.)	<b>AG Bell</b> Certification (LSLS™ Cert. AVT/ Cert. AVEd)	<b>VA Department of Education</b> (State Licensure)
<b>Continuing Education Requirements</b>	<b>30 hours/3 years</b>	<b>none</b>	<b>15 hours/2 years</b>	<b>180 pts./5 years</b>
Parent coaching ( <i>n</i> = 11)			✓	
Language facilitation techniques ( <i>n</i> = 7)	✓		✓	
Family-centered practices ( <i>n</i> = 10)			✓	
Socially, culturally, and linguistically responsive practices ( <i>n</i> = 8)	✓	✓	✓	
EDHI 1-3-6 Plan ( <i>n</i> = 3)				
Legal aspects ( <i>n</i> = 1)				✓
Communication choices ( <i>n</i> = 3)		✓		✓
Impact of hearing loss on communication ( <i>n</i> = 4)	✓	✓	✓	✓
Screening, evaluation, and assessment (includes dynamic assessment) ( <i>n</i> = 14)	✓	✓	✓	✓
Audiology ( <i>n</i> = 4)	✓		✓	✓
Speech science ( <i>n</i> = 3)	✓		✓	✓
Amplification, troubleshooting, and FM systems ( <i>n</i> = 8)		✓	✓	
Cochlear implants ( <i>n</i> = 2)			✓	
Visual system development including ASL or SEE ( <i>n</i> = 7)		✓		

Auditory skill development ( <i>n</i> = 7)		✓	✓	
Bimodal communication including ASL, SEE, and oral communication ( <i>n</i> = 2)		✓		
Receptive language development ( <i>n</i> = 5)	✓	✓	✓	✓
Expressive language development ( <i>n</i> = 6)	✓	✓	✓	✓
Speech development ( <i>n</i> = 1)	✓		✓	✓
Overall typical and atypical development ( <i>n</i> = 7)	✓		✓	
Planning and implementation of services ( <i>n</i> = 1)	✓	✓	✓	
Literacy ( <i>n</i> = 1)		✓	✓	

**American Speech-Language Hearing Association (ASHA).** Professionals seeking to obtain and maintain a Certificate of Clinical Competence in Speech-Language Pathology (CCC-SLP) from ASHA (2013) must have knowledge as well as skill outcomes that align with early intervention practices when working with children who have a hearing loss. Professionals must be able to provide appropriate assessments and interventions for these children and their families. However, there is no specific mention of parent or caregiver coaching or knowledge of auditory skill development in any of the standards.

**Council for Exceptional Children (CEC).** In 2008, CEC in conjunction with the Council for the Accreditation of Educator Preparation (CAEP) and the Council on the Education of the Deaf (CED), developed a set of mutually agreed upon standards for teachers of children with hearing loss. The standards, published by CEC, guide state departments of education regarding teacher preparation programs for those seeking state licensure as a Teacher for the Deaf/Hard-of-Hearing (TDHH). The Council for Exceptional Children (2013) revised their standards for professionals obtaining an initial licensure in Special Education: Deaf/ Hard-of-Hearing develop competencies in the areas of learning differences, learning environments, and instructional planning and strategies. These standards ensure that teachers have appropriate entry-level skills with effective mentoring (CEC, 2013). However, the one teacher preparation program in Virginia for TDHH, located at Radford University, is not listed on the CAEP or CED websites as meeting these minimal standards for accreditation (CAEP, 2015; CED, n.d.).

**Virginia Department of Education (VA DOE) and state licensures.** In Virginia, Radford University is an approved teacher education program (VA DOE, 2013); therefore, graduates can apply for a VA DOE teaching license with an endorsement in Special Education Hearing Impairments PreK-12 after successful completion of their program. If a professional

from out-of-state applies for licensure, they must have completed 27 semester hours in education of the hearing impaired, including at least one course in the areas of: (a) foundations/legal aspects of special education; (b) characteristics of individuals with hearing impairments; (c) psycho-educational assessment; (d) instructional programming; (e) speech-language development; (f) behavior management; (g) audiology; (h) speech and hearing science; and (i) communication modalities.

However, JCIH (2000) recommended that EI providers be trained in the specific communication modality chosen by the family, which may be a sign-based system or a spoken methodology. The Massachusetts Department of Education (2014) recently changed their TDHH licensure requirements to include two designations – one for Oral/Aural (O/A) and one for American Sign Language/Total Communication (ASL/TC). Virginia has one educational endorsement from the VA Department of Education (VA DOE) as a TDHH PreK-12 (VA DOE, 2013), not specifying any one or a variety of communication choice(s).

**Alexander Graham Bell Association for the Deaf and Hard-of-Hearing (AG Bell).**

Listening and Spoken Language Specialists (LSLS<sup>TM</sup>) are Teachers for the Deaf/Hard-of-Hearing (TDHH), Audiologists, or Speech-Language Pathologists (SLP) who obtain advanced certification from the AG Bell Academy for Listening and Spoken Language. These professionals specialize in developing spoken language in children by demonstrating a high level of competency while adhering to the Principles and Practices of Auditory-Verbal Therapy (AG Bell Academy for Listening and Spoken Language, 2007). Professionals certified as either LSLS<sup>TM</sup> Certified Auditory-Verbal Therapist (LSLS<sup>TM</sup> Cert. AVT) or Certified Auditory-Verbal Educator (LSLS<sup>TM</sup> Cert. AVEd), comprise 43.2% TDHH, 38.8% Speech-Language Pathologists, 11.8% Audiologists, and 6.3% School Administrators. LSLS<sup>TM</sup> professionals abide by 10

principles based on either their designation as a LSLSTM Cert. AVT or LSLSTM Cert. AVEEd, each of which includes the concept of guiding and coaching caregivers. These principles are consistent with the research regarding coaching and language facilitation techniques discussed previously (Bredekamp & Rosegrant, 1992; Dinnebeil, 1999; Dunst, 2002; Dunst & Trivette, 2009; Friedman et al. 2012; Korfmacher et al., 2008; Roberts & Kaiser, 2011).

LSLSTM Cert. AVEEds provide services in the school systems during individual, small group, or classroom settings. LSLSTM Cert. AVTs provide services one-on-one with children and families in a variety of placements including the natural environment, including EI Part C. For the LSLSTM Cert. AVT, six of the 10 principles address coaching caregivers. These include:

- Guide and coach caregivers to help their child use hearing as the primary sensory modality in developing listening and spoken language.
- Guide and coach caregivers to become the primary facilitators of their child's listening and spoken language development through active and consistent participation in individualized Auditory-Verbal therapy.
- Guide and coach caregivers to create environments that support listening for the acquisition of spoken language throughout the child's daily activities.
- Guide and coach caregivers to help their child integrate listening and spoken language into all aspects of the child's life.
- Guide and coach caregivers to use natural developmental patterns of audition, speech, language, cognition, and communication.
- Guide and coach caregivers to help their child self-monitor spoken language through listening (AG Bell Academy of Listening and Spoken Language, 2007).

The caregiver coaching model is the core of Auditory-Verbal Therapy (AG Bell Academy of Listening and Spoken Language, 2007). In order to obtain the LSLS<sup>TM</sup> certification, professionals must: (a) be supervised for a period of 3 years with documented progress and evaluations; (b) complete 900 direct contact therapy/education hours; (c) complete continuing education competencies within nine domains; (d) obtain endorsements from caregivers of children they have served; and (e) meet the academic requirements for a bachelor's degree or master's degree in the field of deaf education or related area. Once these standards are met, a professional can apply to take the 4-hour credentialing examination.

### **Professional and Caregiver Perspectives**

Rice and Lenihan (2005) interviewed 13 in-service professionals providing EI services to families of children with hearing loss, using Auditory-Oral or Auditory-Verbal methodologies. Focused interviews were based on seven professional competencies essential to providing EI services for families of children with hearing loss, suggested by the JCIH (2000) and the *Joint Committee of the American Speech-Language Hearing Association and the Council of the Education of the Deaf* (1994) regarding service provision to children who are deaf and hard-of-hearing, ages birth to 3 years. The researchers discovered that professionals felt their graduate programs did not adequately prepare them for the challenges in providing EI services and that they gained this knowledge while working with families. EI providers indicated that their knowledge of child development and family-centered intervention was gained through mentoring experiences and trans-disciplinary teams rather than through coursework completed for their respective degrees. Therefore, professionals believed they had not received the necessary coursework to provide services to these families, supported in part by the Dolman (2008) study on college curricula.

Rice and Lenihan (2005) also interviewed 11 caregivers to explore their perception of EI and the competencies of EI providers. Caregivers reported extensive knowledge of hearing loss, experience with multiple disabilities, empathy, and compassion as valuable characteristics of EI providers. One family reported having several service providers until they found one who was knowledgeable about hearing loss and spoken language development. However, the reoccurring theme was that caregivers wanted to be empowered as active members of the early intervention team and to have their children be empowered by having professionals believe in their abilities. Overall, Rice and Lenihan (2005) found that caregivers valued interventionists who provided family-centered intervention more than providers who had the newest information. The researchers did not extensively examine the professional training and educational backgrounds of the EI providers, their views about caregiver coaching, or how a child's progress influences their subsequent caregiver coaching.

### **Continuing Professional Development**

Noting the lack of required coursework about caregiver coaching in professional preparation programs, Friedman et al. (2012) attempted to operationalize the definitions of caregiver coaching using several measures, including the *HVOF*, *Natural Environments Rating Scale (NERS)*, and the *Triadic Intervention and Evaluation Rating Scale (TIERS)*. One provider was selected by the researchers to exemplify the differences in the use of caregiver coaching prior to and after professional development. Friedman et al. (2012) stated that the percentages of use of some strategies during observations increased, including conversation and information sharing and observation. However, joint attention and caregiver feedback decreased. Caregiver coaching strategies were not observed during observations prior to professional development and increased to 15% of the EI session after professional development for this one provider.

Like Friedman et al. (2012), Peterson et al. (2007), observed 38 families and 15 service providers during 160 home visits using the *HVOF*. Peterson et al. (2007) found that the actual time spent on caregiver coaching was much less than the providers perceived once they were interviewed after the sessions. Peterson et al. (2007) also documented that less than 1% of the total time during the session was spent on the combination of coaching caregiver-child interactions and modeling for caregivers. Similarly, Salisbury and Cushing (2013) found direct teaching was the most prevalent strategy used in both provider-led intervention and triadic home visits. These findings support the results of Peterson et al. (2007) and indicate the need for expanded professional development targeted toward caregiver coaching for in-service providers.

Harrison et al. (2016) used online questionnaires to describe factors affecting EI services for children with a hearing loss. The researchers surveyed 122 professionals regarding their professional preparation and experience on 18 essential skill areas associated with intervention and assessment of children with hearing loss. The researchers reported that 42.8% of the respondents held degrees or certifications in Speech-Language Pathology, early childhood education, or early childhood special education, where sign language is not a required component of their professional training. Harrison et al. (2016) used a self-assessment of skills they termed “comfort scores” for each area; although it was not a primary focus of their research. The participants completed a self-report of comfort on a Likert scale of 1 (no comfort) to 4 (high-level of comfort) to rate their comfort level in each of the 18 essential skill areas. Harrison et al. (2016) found a weak correlation ( $r = .19$ ) between the number of years of experience and the confidence of the provider in developing language development through daily routines and play. Additionally, there was a weak correlation between years of experience and developing listening skills ( $r = .16$ ). The strongest correlation was between caseload composition and

developing listening skills ( $r = .69$ ), meaning that when practitioners were mainly serving children with hearing loss, their comfort in developing listening skills was higher. There was a weak correlation between developing listening skills and obtained specialization certifications ( $r = .23$ ); although it was higher than years of experience.

Overall, there was a lack of variance with any of the comfort scores, which can be a function of the limited scale (1-4) or of a high level of preparation among the cohort. Harrison et al. (2016) noted that there might be another plausible moderating factor not observed in their analysis and called for refined measures of researching professional preparation. The researcher's findings indicate that regardless of professional preparation background, years of service, families' chosen mode of communication, the providers feel they are able to work with families of children with hearing loss.

However, these results are contrary to the findings of Compton et al. (2009). Compton et al. (2009) explored the training and preparedness of Speech-Language Pathologists (SLPs) in North Carolina to provide school-age services to children with cochlear implants. The researchers used a quantitative approach and found that most SLPs in the school system felt they were not prepared to provide services to this population of children regarding therapy or knowledge of equipment. Nearly half of the participants in this study received no coursework or only one lecture on cochlear implants and habilitation in their graduate coursework. One fourth of the most recent graduates (ages 22-35) had received no coursework in cochlear implants. Only 3 of the 190 respondents had an entire course in cochlear implants. Only 3.9% of the participants had graduate level practicum experience in working with children who had cochlear implants. Twenty-one percent of the SLPs surveyed reported having any training in habilitation for children with cochlear implants in their post-graduate training or professional development.

Seventy-nine percent of the participants had little to no confidence in their ability to provide services to children with cochlear implants. Seventy-nine percent of the SLPs surveyed reported that they did not have access to workshops, printed materials, or in-service training regarding cochlear implant habilitation. Compton et al. (2009) called for more research regarding the preparedness of TDHHs and SLPs on a national level as well as revising the preservice curricula for SLPs to include practical training, specifically with children who have cochlear implants.

**Formal continuing education programs.** Continuing education for professionals is crucial to meeting the needs of a diverse population of children with hearing loss and a requirement for continuing licensure and educational endorsements (VA DOE, 2013; ASHA, 2014). Best practices for professional development is complex, but Darling-Hammond and Bransford (2005) outlined several criteria to remember when creating meaningful professional development including: (a) using research-based content and skills; (b) utilizing the principles of adult learning theory; (c) providing information that is relevant to the professionals' work; (d) be sustained, ongoing and supported by modeling/coaching; (e) embedded into daily responsibilities; (f) collaborative; and (g) provide opportunities for discussion, follow-up, and reflection after completion. Large-scale (national) professional development opportunities were developed to meet the needs of the professionals focused on training in-service practitioners by addressing content knowledge (Houston, Nevins, & Wilson, 2010). The *Carolina Summer Institute in Auditory-Verbal Practice* and *First Years* are examples of two such programs (Houston et al., 2010) offered in North Carolina meet many of the criteria set by Darling-Hammond and Bransford, and are open to service providers from across the country. There are no programs similar to these in Virginia. Additionally, a conceptual framework using technology

to mentor professionals working towards LSLS™ certifications has recently emerged (Clem, DeMoss, & Wilson, 2012).

*Carolina Summer Institute in Auditory-Verbal Practice.* The *Carolina Summer Institute in Auditory-Verbal Practice* is a two-week intensive training program encompassing lecture, therapy observation, lesson planning, and practical hands-on experience in providing auditory-based interventions (Houston et al., 2010). This program began in 1998 and continues today. The *Carolina Summer Institute in Auditory-Verbal Practice* is comprised of various elements based on the both the How People Learn (HPL) framework (Darling-Hammond & Bransford, 2005) and the Train-the-Trainer (TTT) professional development model.

The HPL Framework is comprised of four areas: knowledge-centered, student-centered, assessment-centered, and the larger community centeredness. HPL addresses “deeper learning” as well as “transfer” of skills and knowledge. There is a paradigm shift away from merely rote memorization of facts to having a real-world connection with the material being taught. The need for professionals to increase their content knowledge is well-documented in research (Houston, 2010; White, 2006). The strategies used to increase content knowledge included lecture, self-assessment, and self-reflection. However, the real-world connection is implemented with the TTT model with hands-on experiences with children that have hearing loss and in caregiver coaching with support. This support is provided by experienced professionals that work in the session collaboratively to provide professional coaching and mentoring in real-time.

Short-term outcomes incorporated into the *Carolina Summer Institute* include participants increasing their knowledge of technology, spoken methodologies, therapeutic strategies and supports, as well as experience in caregiver coaching. Additionally, outcome measures were comprised of pre-and post-intervention (i.e. lectures and training) assessments.

Long-term outcomes aimed to increase in the number of LSLS<sup>TM</sup> certified professionals worldwide. Between 2002 and 2010, there were 25 professionals who attended the *Carolina Summer Institute* each summer to obtain training hours towards the LSLS<sup>TM</sup> certification (Houston, 2010).

***First Years online learning community.*** The *First Years* program was an online learning community developed collaboratively between AG Bell Association of the Deaf and Hard-of-Hearing and the University of North Carolina Division of Speech and Hearing Sciences with the intent of providing a comprehensive continuing education program addressing the critical shortage of professionals trained in spoken methodologies. The *First Years* program was operational from 2000-2012, when the program lost state funding. The program was considered highly successful in the professional community by providing mentorship opportunities paired with extensive coursework (Houston, 2012).

***Mentorship through technology.*** Establishing and maintaining a meaningful mentoring relationship is the backbone of a first-year professional's development when working with children who are DHH (ASHA, 2014; CEC, 2013). This also can be true of seasoned professionals gaining experience in working with children using spoken methodologies (Clem et al., 2012). The expanded use of technology to connect individuals in professional mentoring relationships is a promising new endeavor and is representative of the Train-the-Trainer model (TTT). Clem et al. (2012) defined mentoring models using the one-to-one, peer-to-peer, group, or reverse mentoring processes. In deaf education, traditional mentorships include a supervising teacher, clinical supervisor, or a clinical fellowship year supervisor (Clem et al., 2012). To meet the increased demand for qualified professionals, Clem et al. (2012) presented a conceptual framework for using distance technologies to provide mentees with more qualified mentors

based on their supervisory needs and expectations. This framework uses video conferencing software, such as Skype, to develop a relationship, complete real-time or recorded observations and collaborate despite physical distances. Given that hearing loss is a low-incidence disability, the professional community must have practical strategies for mentoring professionals. The use of tele-mentorship (Houston, 2013; Wasonga, 2007) allows professionals to develop inter- and intrapersonal relationships and increase their content knowledge to implement evidence based practices, including auditory skill development, to a growing population of children with hearing loss receiving services in home and inclusive environments. However, the effectiveness of these programs is not documented in research publications on professional learning outcomes or improved child language and literacy outcomes.

### **National Agenda**

*The National Agenda: Moving Forward on Achieving Equality for Deaf and Hard of Hearing Students* (2005) published by the National Deaf Education Project (NDEP) outlined the shared vision for D/deaf education in America with eight goals toward the development of a comprehensive educational system for children who are DHH including: (a) early identification and intervention; (b) communication, language and literacy; (c) collaborative partnerships; (d) accountability and high stakes testing; (e) placement and programs; (f) technology; (g) personnel preparation; and (h) research. These goals align state standards with the Council on the Education of the Deaf (CED) national standards, an increase in required coursework in general education curricular areas, development of high-quality alternative pathways to credentials, retention and recruitment of qualified teachers, and increasing the level of proficiency of sign language interpreters. While an increase in the content knowledge of professionals regarding auditory skills, speech acoustics, and technology is not indicated in the professional preparation

goal, there are numerous references to family-centered programming and use of auditory skills. Goal 1.3 stated, “deaf and hard of hearing children, like all children, require and should have a number of options for the selection and development of communication and language and educational programs.” Additionally, goal 2.6 stated that the family is essential in fostering language competency, and families should be provided support in developing their child’s language skills. The following was given as the rationale for this goal:

Ninety percent of deaf and hard of hearing students are born to hearing parents. Most of these students are language-delayed because they miss the early development of language that is typically acquired through hearing and speaking English or whatever the family’s spoken language is. Families have historically not been provided with the support and services and programs necessary to help them develop communication and language competency and therefore help their children acquire such skills. Such services and programs must be available to all families of deaf and hard of hearing children so they can assist their children in understanding, interpreting, and communicating about the world around them. (p. 20-21)

The Laurent Clerc National Deaf Education Center (Szymanski et al., 2013) at Gallaudet University published *Critical Needs of Students Who are Deaf or Hard of Hearing: A Public Input Summary*. The center solicited comments as an open call regarding perceived barriers that prevent those with hearing loss from achieving “academic, linguistic, and social-emotional potential” (Szymanski et al., 2013, p.7). Szymanski et al. (2013) identified fourteen themes present in the 775 responses including: (a) early hearing detection and intervention; (b) language and communication; (c) qualified direct service personnel; and (d) resources. The need for early

hearing detection and intervention expressed by participants included access to qualified professionals despite geographic limitations. Additionally, language and communication were seen as barriers to achievement because a family needs to have access to a variety of communication choices. The example explaining language as a barrier stated:

Students who are deaf or hard of hearing need access to information via whatever means possible. This could include sign language, Cued Speech, oral interpreting, hearing aids, FM systems, captioning, cochlear implants, etc. These need to be available in educational settings and beyond. Some students communicate best with sign and some best with oral/audition. All should be embraced and respected. No judgment should be placed on students who associate with one communication method... A solid foundation in a language...is critical. (p. 10)

Access to qualified personnel was seen as a barrier, including the need for training programs comprising both sign language and spoken language with practicums. Finally, the lack of resources consisted of a lack of trained personnel, funding, and the need for public education was seen as a barrier to successful outcomes.

### **Virginia State Performance: Part C Services**

The Individuals with Disabilities Education Improvement Act (IDEA, 2004) requires states to report state-level data in both Part C (Early Intervention) and Part B (preschool and school-age) services. Each locality documents progress in specified areas and the results are then reported to the federal government. The areas of data tracking for Part C, with the most recent data, are reported and discussed within the context of children with hearing loss.

**Infant and Toddler Connection of Virginia: Outcomes in EI.** Virginia is required to annually report performance of three outcomes for all children in early intervention: (a) positive social-emotional skills; (b) acquisition and use of knowledge and skills (language and communication); and (c) use of appropriate behaviors to meet their needs. The EI professionals report on these outcome measures for each family. The information is not broken down into any specific disability; therefore, there is no specific public data available at the state-level for children with hearing loss receiving services in EI. However, there are a Part C State Performance Plan (SPP) and Annual Performance Report (APR) submitted. The latest report from 2014 (Virginia Infant & Toddler Connection) indicated there were 7, 876 children in the state receiving services through Part C with greater than 99% of them receiving services in the natural environment. On the second outcome measured, acquisition and use of skills, 47% of the children in EI in Virginia either did not make progress or did not make enough progress to demonstrate age-appropriate skills.

Indicator 11 of the APR tracks the State Systemic Improvement Plan (SSIP). The SSIP included input from key stakeholders with the Virginia Interagency Coordinating Council (VICC) serving as key stakeholder. The VICC is comprised of representatives from Department of Education, Department of Health, Department of Social Services, Department of Medical Assistance Services (the state Medicaid agency), Department for the Blind and Vision Impaired; Department for the Deaf and Hard of Hearing, State Corporation Commission – Bureau of Insurance, other early childhood programs, families of children currently or previously enrolled in early intervention, local system managers, early intervention providers, and the state legislature. There are four improvement strategies contained in the APP on Indicator 11 for

improving and measurable outcomes of children in EI in Virginia (Infant and Toddler

Connection of Virginia, 2014). These are:

1. Identify and/or develop, and implement the professional development resources and mechanisms for ongoing support necessary to ensure early intervention service providers, including service coordinators, consistently conduct initial and ongoing functional assessment that leads to consistent and accurate determination of entry/exit ratings in the area of children using appropriate behaviors to meet their needs;
2. Identify and/or develop and implement the professional development resources and mechanisms for ongoing support necessary to ensure early intervention service providers, including service coordinators, consistently use coaching and natural learning environment practices when planning and delivering early intervention services;
3. Increase local system capacity to determine the extent and fidelity of provider use of evidence-based practices, including the ability to identify and address fiscal and other local system issues that support or hinder full implementation of these practices and the ability to assess the impact of evidence-based practices on results for children and families; and
4. Enhance the capacity of the statewide early intervention data system (ITOTS) to efficiently collect and report comprehensive data on child outcome results that helps in evaluation and improvement planning at the state and local levels. (p. 39)

Each of these strategies, contained in the APP and suggested by the key EI stakeholders, are directly related to the research questions and future findings of this study. This study determined the professional development needs of the professionals providing children with hearing loss

services in Virginia including assessment, intervention, and evidence-based practices contained in the State Systematic Performance Improvement Plan.

### **Summary of Literature Review**

There is a system of support for families of children with hearing loss in Virginia, including early screening and identification (*Figure 2*). Once a hearing loss is identified, a child is then referred for Part C EI where they have access to services intended to improve communication, language, and functional outcomes. Through the use of family-centered practices, families have many communication options open to them, including developing spoken language in conjunction with the latest audiological and medical management.

Furthermore, children with hearing loss have the opportunity to develop spoken language skills when the EI provider has specialized training above the minimal requirements of ASHA, CEC, and the Virginia Department of Education (ASHA, 2013; CEC, 2013; VA DOE, 2013). The outcomes of these children rely on highly qualified professionals from both the medical and educational fields working together to create an infrastructure to support the guidelines set forth by the JCIH (2000; 2007) and Yoshinaga-Itano (2014). Current research studies have not explored professionals' knowledge regarding auditory skill development or caregiver coaching despite both areas being identified as necessary for the development of spoken language in children. Knowledge and experience in both of these areas has a direct impact on service delivery that has yet to be examined from the view of a professional providing these services; and has not been addressed in the mixed methods research.

Virginia families that have a child with a hearing loss are at a disadvantage compared to families in other states. First, 56% of the children identified through Universal Newborn Hearing Screening are not receiving EI services where other states reported no loss to follow-up services

(CDC, 2014). Second, Virginia has only one university training program for Teachers for the Deaf and Hard-of-Hearing and it does not meet the minimal standards of accreditation from CAEP, CEC or CED whereas states such as California, Missouri, and New York have three accredited programs each (CED, 2016). Third, there are no state-wide trainings that meet the criteria set forth by Darling-Hammond and Bransford (2005) for professionals. Serving children with hearing loss, regardless of communication modality, requires a specialized set of skills. Developing professional development based on adult learning theory, and Darling-Hammond and Bransford (2005) criteria, can meet the needs of professionals in Virginia by: (a) identifying the professionals working with these children in EI; (b) assessing their current skills and knowledge in coaching and auditory skill development; and (c) directly asking the professionals themselves what they need in terms of professional development.

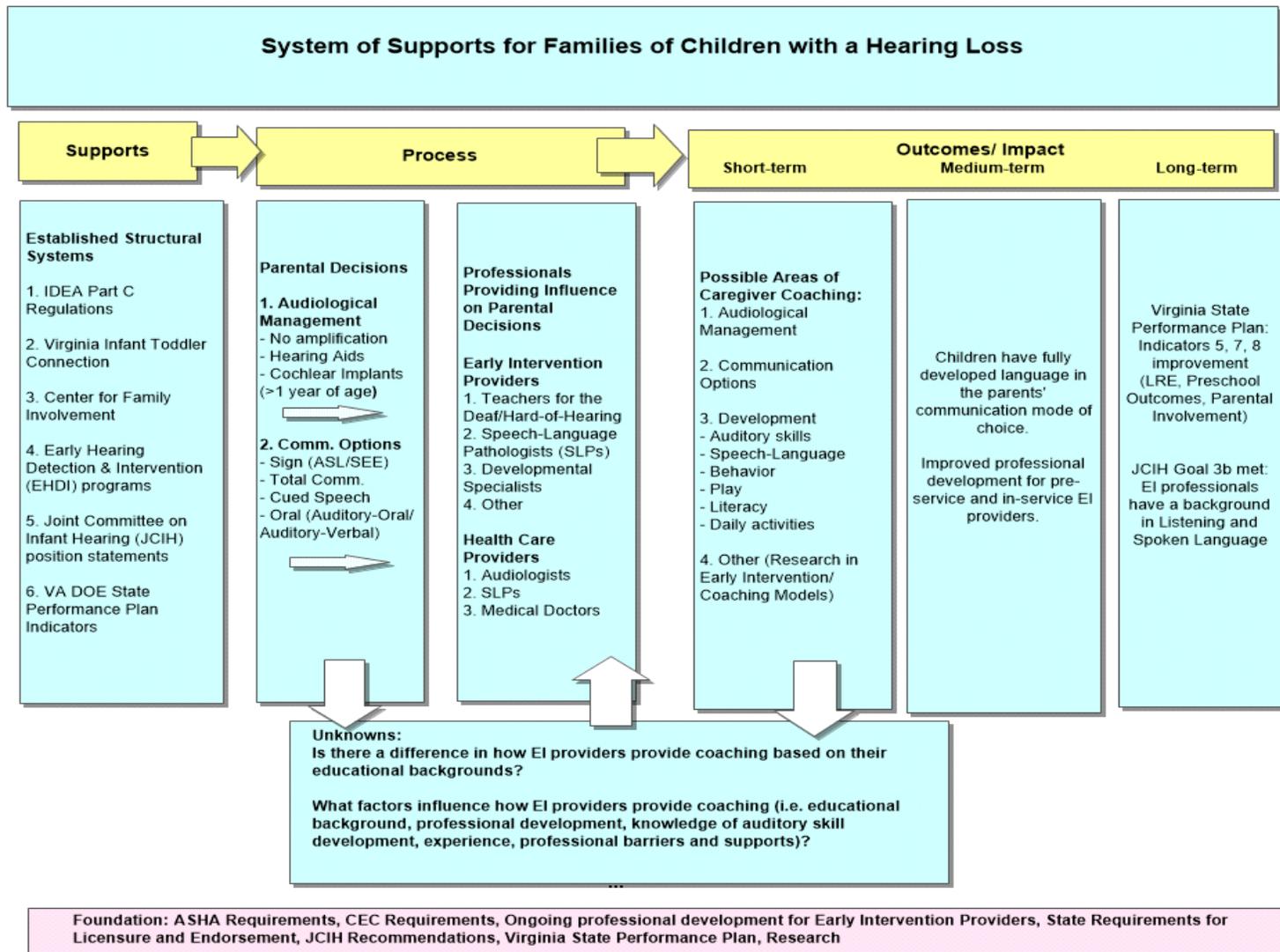


Figure 2. System of support for families of children with hearing loss.

## Chapter III

### **Methodology**

Yoshinaga-Itano (2014) advocated for the development of appropriate professional development guidelines that support evidence-based practices despite the varied professional backgrounds of those who provide services in the Early Detection Hearing Intervention (EDHI) and Early Intervention (EI) programs. EI professionals are required by the Office of Special Education Programs (OSEP) to measure child progress on specific child and family outcomes including language development (OSEP, 2016). To that end, the JCIH (2007) suggested that guidelines be adopted and implemented that address professional qualifications in providing family-centered intervention for children in EI programs who have an identified hearing loss resulting in optimal child and family outcomes. Providing quality services using family-centered practices for families of children with hearing loss requires specialized skills. Currently, the Virginia State Systemic Improvement Plan (SSIP) for Part C services has a goal of increasing language use and knowledge of children receiving services through professional development in evidence-based practices.

The purpose of this research was to examine the relationship between the EI provider's background and their comfort with caregiver coaching and auditory skill development to develop professional development programs for providers who work with children with hearing loss and families that have chosen spoken communication methodologies. Specific research questions

were explored in two distinct phases. Analysis of the first phase grouped participants into representative categories of the population. Participant interviews of members of these groups comprised the second phase with analysis of the findings from each phase brought together to address the mixed method research questions.

1. Phase One: Quantitative Research Questions

RQ1: How do participants' educational backgrounds relate to their comfort providing caregiver coaching?

RQ2: How do participants' educational backgrounds relate to their comfort with intervention targeting auditory skill development?

2. Phase Two: Qualitative Research Questions

RQ3: What are EI providers' perceptions regarding their educational background and professional experiences with caregiver coaching as applied to auditory skill development?

RQ4: How are EI providers' beliefs influenced by the family-child outcome requirements when providing coaching to families regarding communication development?

3. Mixed-Method Research Questions

RQ5: In what ways do the experiences of EI providers explain their perceptions of caregiver coaching and auditory skills development?

RQ6: How do the ASHA, CEC, and AG Bell standards influence any differences between the beliefs of EI providers regarding caregiver coaching and auditory skill development?

## **Study Design**

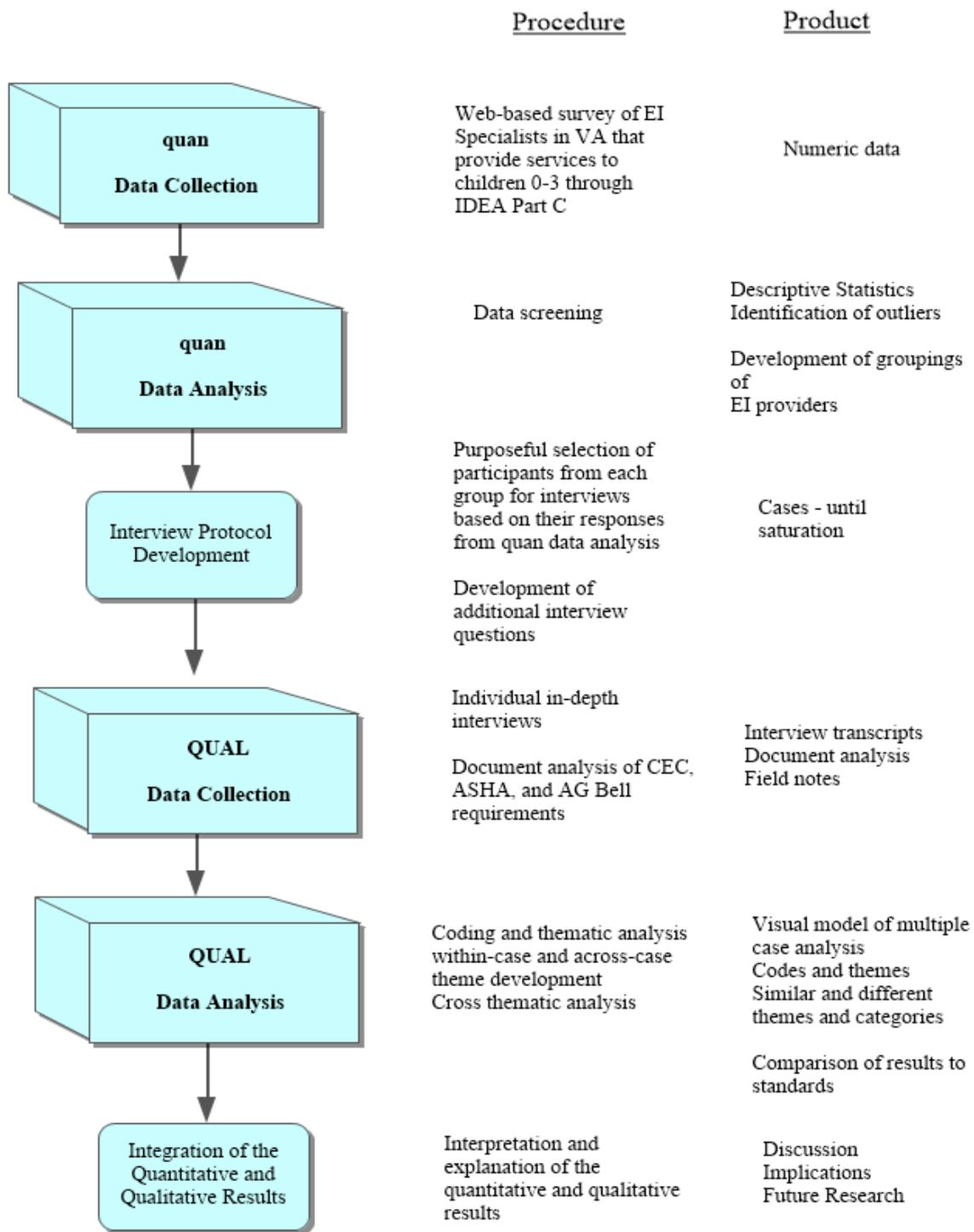
Creswell and Plano-Clark (2011) defined mixed-methods research by not only the combined methods of quantitative and qualitative research, but also by how they are integrated, which one is given priority, the timing of the phases, how they are framed philosophically, and what specific mixed method design is then used to answer the research questions. The two research methods are complementary and provide a richer understanding of the research problem (Onwuegbuzie & Johnson, 2006). This study used an explanatory sequential design where the quantitative data from the first phase developed groups and informed qualitative data collection measures (Creswell & Plano-Clark, 2011). Depicted as quan + QUAL = explain results, this study used a fixed design with priority placed on the second qualitative phase. In other words, the design allowed the first quantitative phase to result in a general understanding of the research problem, with explanation acquired through the second qualitative phase. The quantitative phase consisted of data collection using a survey partially based on a previously validated questionnaire developed by Compton, Flynn, and Tucker (2009) as a needs assessment for speech-language pathologists in North Carolina and incorporated comfort scores in working with children with hearing loss like Harrison (2016). The results from the quantitative phase yielded groupings of EI professionals, and informed the purposeful sample selection, data collection, and analysis used during the qualitative phase (Creswell & Plano-Clark, 2011), thus supporting the rationale that the use of quantitative data to inform the qualitative design which would provide a richer understanding of the participants' experiences (Onwuegbuzie & Johnson, 2006). In the exploratory follow-up, the researcher inquired about the educational and training experiences of service providers to explore the impact of their training on clinical practice within the EI system.

Integration of data after both the quantitative and qualitative phases allowed the researcher to answer the mixed-methods research questions and to address how the standards from each professional designation influenced their perceived service delivery. Participants were selected from each group of EI providers consisting of Teachers of the Deaf/Hard-of-Hearing (TDHH), Speech-Language Pathologists (SLPs), and Developmental Specialists. These professionals were identified during the quantitative phase so that each group was represented. Selection of participants was based on extreme cases determined from the quantitative data collection, and qualitative interviews were completed to the point of saturation of data. Extreme cases were defined as representatives from each set of professionals responding to the survey varying greatly in their respective responses based on the mean and standard deviation. For example, selected cases indicated that they had extensive educational background in auditory skill development or caregiver coaching as well as those with little or no educational experience in these areas.

*Figure 3* is a diagram of the procedures for implementation of this study. The procedures and products at each phase are listed. The first phase consisted of quantitative data collection followed by quantitative data analysis that informed the qualitative sample selection and development of measures used. The second phase consisted of qualitative collection and analysis. Finally, the results from the quantitative and qualitative phases were integrated to answer the mixed-methods research questions and jointly display the data from both phases.

A mixed-methods approach to study caregiver coaching for families of children with hearing loss was necessary to address the lack of research in studying professional training of those working with a low-incidence population. Using quantitative and qualitative methods in isolation would be insufficient to address the research questions, and the combined use of

methods provided a more complete understanding of the research problem (Creswell & Plano-Clark, 2011). Additionally, combining methods allows for weaknesses of one methodology to be enhanced by the strengths of the other (Creswell & Plano-Clark, 2011; Onwuegbuzie & Johnson, 2006). In this research, the interviews enhanced and gave voice to the numeric data.



*Figure 3.* Explanatory Sequential Design: Early Intervention Providers: Differences and Perceptions in Training, Caregiver Coaching, and Auditory Skill Development

## **Data Collection and Analysis**

This research included two iterative stages with the first stage informing the development of the second. First, the researcher conducted an online survey administered to EI providers comprising Developmental Specialists in Virginia. Second, semi-structured interviews and a document analysis were completed. Integration of results answered the mixed-methods research question.

### **Quantitative Phase**

The quantitative research questions ask, ‘How do participants’ educational backgrounds relate to their comfort providing caregiver coaching?’ and ‘How do participants’ educational backgrounds relate to their comfort with intervention targeting auditory skill development?’ To answer the quantitative research questions, the sample, materials and procedures, data management and analysis are described below.

**Participants and setting.** Participants were recruited by contacting the Virginia Infant & Toddler Connection and identifying all EI professionals in the state who had obtained EI certification through that office. In order to be a certified EI provider in Virginia, the following criteria must have been met:

1. Met discipline-specific requirements to provide EI services in Virginia. These include, but are not limited to Audiologists, Early Intervention Assistants, Early Intervention Service Coordinators, Educators (Special Education or Early Childhood), Educators of the Hearing Impaired (TDHH), and Speech-Language Pathologists. Discipline-specific requirements for TDHH includes licensure through the Virginia Department of Education with an endorsement in Hearing Impairments PreK through 12<sup>th</sup> grade (Infant and Toddler Connection of Virginia, 2011, p.10-14). Speech-

Language Pathologists are required to hold licensure from the Virginia Department of Health Professions.

2. Completed online training modules through the Infant & Toddler Connection of Virginia (ITC) and passed the competency assessments for each area including child development, family-centered practices, service pathway, and practitioner requirements.
3. Submitted an online application that includes signing a document stating that the practitioner will follow all local, state, and federal guidelines.

These individuals and their contact information is publicly available information, and were contacted directly via email by the ITC project director. Additionally, EI service coordinators were contacted to disseminate information regarding the study and to recruit participants by contacting each of their respective counties publicly listed in the central directory. Links to the survey were sent directly to the providers with email or mailing addresses on record, and to the Central Point of Entry contact for each of the local EI systems in Virginia so that all EI providers in the state had an opportunity to participate in the study.

Participants were selected if they obtained EI certification through Virginia. The beginning of the survey determined if they had provided services to children with hearing loss within the last five years. If they had not, they were asked if they are open to working with this population of children. If not, they were not asked to complete any more questions on the survey. This allowed the researcher to quickly identify those EI providers who provide or have a desire to provide services specifically to children with hearing loss.

Probabilistic sampling was used. There are approximately 2,524 professionals in Virginia serving children in the EI system who have obtained EI certification. However, the number of EI

professionals serving children with hearing loss is unknown and cannot be extrapolated from the number of children receiving services, the Part C--EI reporting by Virginia, or the EDHI 1-3-6 database. Additionally, many EI providers work across districts so accessing individual districts to identify their providers would not assist in identification. It was expected that the professionals providing services had educational training as Speech-Language Pathologists, Teachers for the Deaf/Hard-of-Hearing, or Developmental Specialists based on the research from Harrison et al. (2016).

Initially, each participant was asked to identify if they have provided services to children with hearing loss in the past five years and if they are open to working with this population of children. A normal distribution was not expected based partially on the results from Harrison and colleagues (2016) and from the researcher's experience in working with EI professionals across Virginia over 15 years. Typically, EI professionals with a background in speech-language pathology have diverse caseloads and have not been exposed to information regarding auditory skill development in children or caregiver coaching. Additionally, Teachers for the Deaf/Hard-of-Hearing are trained to work with school-age children and are unsure of how to approach auditory skill development with a caregiver coaching component. Thus, all responses of participants who identified as either having worked with children with hearing loss in the past five years, or willing to work with this population, were included in the analysis utilizing non-parametric methods secondary to a small sample size.

Groups of participants were identified based on educational background, years of experience, and self-assessments of comfort utilizing Spearman's Ranked Correlational Coefficient also known as Spearman's rho. Spearman's  $r$  assumes a monotonic relationship between the variables, but does not require normal distribution. Spearman's  $r$  converts the scores

to ranked data and has fewer restrictive assumptions than parametric correlations. Information regarding the study was provided to and informed consent was obtained from all participants. Standard procedures were established for securing data, and are explained in further detail in the data management section.

**Measures.** Constructs, or characteristics, measured by the survey included: (a) professional background and demographic data; (b) self-assessment of expertise in auditory skill development; and (c) caregiver coaching practices relative to auditory skill development. The measures are described below. The participant survey was adapted from the survey used by Compton et al. (2009), intended to examine the level of preparedness of North Carolina speech-language pathologists (SLPs) who serve school-aged children with cochlear implants. Reliability and validity were not reported in the original survey. The researchers reported completion of a pilot study, but there were no psychometric data reported on either the pilot study or the study itself. The survey by Compton et al. (2009) was specific to North Carolina, addressed only Speech-Language Pathologists, and was not directed to professionals in EI. Therefore, changes to the original survey were made to reflect Virginia's system and specifically target EI professionals. For example, the demographics were expanded to include TDHH, Developmental Specialists, and SLPs. The Preparation and Training section was expanded to include caregiver coaching, but eliminated communication methodology approaches as both auditory skill development and spoken methodology are targeted in the current research.

Additionally, two sections were added to include the use of caregiver coaching as defined in the review of literature, and self-assessment of auditory skill development based on the Auditory Learning Guide (Walker, 2009) and Auditory-Verbal Intervention (Simser, 1993). The self-assessments of comfort with caregiver coaching and auditory skill development are

consistent with methodology used by Harrison (2016). Harrison (2016) attempted to measure the impact of professional preparation and experience in working with children who have a hearing loss by using comfort scores in their analysis. The current research did the same with the areas of caregiver coaching and auditory skill development. The three sections of the survey were grouped: the first section consisted of eight questions; the second section consisted of 18 questions; and the third section comprised two self-assessments using Likert scales for both caregiver coaching and auditory skill development.

Pilot testing of the assessments was not feasible in Virginia given the small sample size; therefore, three local level early intervention providers outside of Virginia reviewed the measures and made recommendations to address construct validity. Additional information regarding steps to ensure construct validity are detailed in the section on validity and reliability.

Components of the Participant Survey (Appendix D):

- ***Professional background.*** Demographic information was collected regarding each participant including: (a) area of specialty; (b) educational background; (c) licensures/certifications; (d) age/gender; (e) area of Virginia where they work; (d) undergraduate and graduate experience in various areas preparing them to work with children who have hearing loss; (d) years of experience; (e) years of experience in EI; and (f) perceived preparedness in working with the population of young children with hearing loss.
- ***Caregiver coaching comfort.*** Participants answered survey questions to determine what caregiver coaching practices they are comfortable using as defined by the literature review with relative to working with families of children with hearing loss. A scale of 1-5 was used with 1 being “never”, 3 being

“sometimes”, and 5 being “always.” Each of the items was assigned to a construct of: (a) characteristics of caregiver coaching; (b) characteristics of traditional model of intervention; (c) language facilitation strategy; or (d) caregiver coaching strategy.

- ***Auditory skill development comfort.*** Participants completed a brief self-assessment of comfort providing intervention with various areas of auditory skill development rating their level of comfort using a 1-5 scale with 1 being “novice”, 3 being “comfortable”, and 5 being “expert.” The items on the assessment were derived from the Auditory Learning Guide (Walker, 2009) and Simser’s guide to auditory development of infants and toddlers (1993). Each item was assigned to a construct based on Erber’s (1982) model of auditory development including: (a) detection; (b) discrimination; (c) identification; (d) comprehension; (e) development; and (f) auditory development strategies.

**Data collection procedures.** Survey data were collected via an online response system managed by the researcher. The surveys were completed using a secure on-line system, VCU REDCap®. REDCap® is a secure web-based application used to administer and store survey responses specifically for research projects, and it is compliant with the Health Insurance Portability and Accountability Act (HIPAA). Data were prepared for analysis by proceeding through a series of steps (e.g. identification of outliers and descriptive statistics). IBM *Statistical Package for the Social Sciences* version 23 (SPSS ®) is a popular program package used for statistical analysis, charting, reporting, data management and data documentation, and was used to analyze all results using both descriptive and inferential statistical analysis.

**Validity and Reliability.** Validity and reliability were not calculated in the original Compton et al. (2009) study. Survey questions on the survey used in the present research were asked in several different wordings without changing the meaning to ensure reliability. Construct validity was completed by three current EI providers outside of Virginia to ensure that the survey addressed the target constructs without superfluous information. These providers consisted of a Speech-Language Pathologist, Teacher for the Deaf/Hard-of-Hearing, and a Listening and Spoken Language Specialist. Each of the areas of auditory skill development were reviewed and placed into the four major categories of the Erber (1982) model of auditory functioning: detection, discrimination, identification, and comprehension. Each of the professionals placed the skills into one of the four categories and their responses were compared. There was a discrepancy between items regarding consonant development, vowel development, and strategies utilized during intervention. Consensus was reached to add two additional categories, development and strategies, with some items fitting two categories or constructs. Additionally, each of the items within the caregiver coaching section identified in the literature was grouped by the outside reviewers. They were placed into categories developed by the reviewers to include (a) characteristics of caregiver coaching; (b) characteristics of a traditional intervention model; (c) language facilitation strategies; and (d) caregiver coaching strategies.

Internal consistency for each construct within caregiver coaching and auditory skill development were measured using Cronbach's alpha. First, internal consistency was measured for each of the items within the smaller constructs. Cronbach's alpha for each of these are depicted in Table 6. Then, Cronbach's alpha was calculated for the larger broader constructs of caregiver coaching and auditory skill development. The broader construct of caregiver coaching yielded a Cronbach's alpha of 0.857. Cronbach's alpha for auditory skill development was

0.987. Mitchell and Jolley (2010) recommend a Cronbach’s alpha of greater than 0.70 to justify internal consistency and the constructs on this measure exceeded this minimum.

Table 6

*Cronbach’s Alpha for Survey Constructs*

Construct	Cronbach’s alpha
Auditory Detection	0.965
Auditory Discrimination	0.961
Auditory Identification	0.908
Auditory Comprehension	0.896
Development	0.950
Auditory Strategies	0.937
<b>Auditory Skill Development</b>	<b>0.987</b>
Caregiver Coaching Characteristics	0.729
Language Facilitation Strategies	0.904
Caregiver Coaching Strategies	0.858
<b>Caregiver Coaching</b>	<b>0.857</b>

**Qualitative Phase**

The qualitative research questions ask, ‘What are EI providers’ perceptions regarding their educational background and professional experiences with caregiver coaching as applied to auditory skill development?’ and ‘How are EI providers’ beliefs influenced by the required family-child outcome requirements when providing coaching to families regarding communication development?’ To answer the qualitative research questions the sample, data collection procedures, and data analysis are described below.

**Participants and Setting.** Participants were selected from respondents to the survey based on their groupings by professional designation, years of experience, and varying levels of expertise. Extreme cases were identified from the quantitative data as those varying greatly in their respective responses based on the means and standard deviations of caregiver coaching and

auditory skill development compared to the entire group as well as compared to their own professional designations. Interviews were completed within one month of survey completion and initial analysis of the quantitative phase of the study.

**Data collection procedures and instruments.** Data collection consisted of participant interviews (Appendix E) as well as secondary document analysis of the standards for professional credentialing agencies. Instruments include a semi-structured interview (Appendix E).

**Participant interviews.** Participant interviews were completed when the level of saturation was achieved, and no new data or relevant information emerged (Biklen & Bogdan, 2007). Of the initial 15 potential interviews, 9 were completed: two emails sent to volunteers for the study that were not returned after two attempts; one volunteer for an interview did not meet inclusion criteria because they did not complete the last two sections of the survey; a third potential interview was excluded because the respondent answered “5” to each of the questions for the last two sections of the survey; and two other potential interviews declined the invitation.

An initial list of questions for the semi-structured interviews is contained in Appendix E. The questions were extended based on the data gathered from the quantitative phase to include information regarding strategies for improving the training that professionals receive and teaming strategies given the variability of professionals providing services.

Of the participants selected for interviews, eight of the nine were familiar with the researcher both personally and professionally. This was unavoidable as the researcher has worked in the same geographic and interest area for the past 18 years. Professional relationships included working within the same district, working in the same classroom, or sharing students on the same caseload currently or in the recent past. These close working relationships could have

potentially influenced responses to interview questions. Thus, the researcher interviewed only one participant that was not immediately known to the researcher. The remaining interviews were completed by three VCU doctoral students who have extensive training in qualitative research methods. The role of the researcher within this study was to complete one of the interviews, transcribe all interviews, serve as one of three coders, and complete all further qualitative data analysis.

Interviews were collected and digitally audio recorded. The researcher used pseudonyms for participants to maintain confidentiality and all recordings were disposed of after transcription. All data are stored on a secure server, VCU Filelocker®, that has passcodes and access limited to the researcher only. Participants were called, and the content of their interviews reviewed with them as a means of member-checking prior to analysis. Additional information regarding their exact years of experience was clarified. Field notes were used during the qualitative phase of this study throughout the interview process to ensure contextual information was documented, thereby adding to the richness of the interview process (Biklen & Bogdan, 2007). This process also helped filter any researcher bias, as these notes helped the researcher reflect on the interviews.

**Data analysis procedures.** Creswell (2011) delineated six steps in the process of qualitative data analysis consisting of: (a) organization of all data; (b) reviewing data; (c) coding interviews; (d) using coding to generate themes; (e) representing themes in qualitative narratives; and (f) interpreting meaning. Interviews were recorded and transcribed verbatim. After all transcriptions were completed, the researcher read through each of them and wrote analytic memos regarding first impressions of the data (Saldaña, 2013). Analytic memos continued through the coding of the data. All data were coded through a four-step process including

attribute coding, hypothesis coding, In Vivo coding, and open coding (Saldaña, 2013). In Vivo coding, also known as literal or verbatim coding, is the process of documenting words or phrases that are unique to a subculture and honors participant voices and assisted the researcher in grasping what was significant to the participants (Saldaña, 2013).

Coding was completed by the primary researcher and two doctoral students at VCU. The two doctoral students had completed a course in qualitative research methods and previously completed coding for other qualitative research studies. The coders were trained on the coding procedures, process, and a priori codes by the primary researcher in separate meetings. One of the VCU doctoral student coders had extensive experience in job-embedded coaching and was able to add to the open codes based on these experiences.

The primary researcher completed the attribute coding. Each interview was coded based on the attributes of the professionals including their professional designation, experience, and level of expertise as indicated by the self-assessment of skills identified during the initial quantitative phase. Second, the interviews were examined line-by-line using hypothesis coding utilizing a priori codes developed from the literature review as well as information gleaned from document analysis of professional standards. A priori coding was completed by the researcher and two doctoral students at VCU. While the two doctoral students were trained in qualitative research methods, they did not have content specific knowledge regarding auditory skills. Therefore, the specific auditory skills examples from the interviews were reviewed by an early intervention specialist with extensive experience in auditory skill development. The primary researcher and EI Developmental Specialist came to consensus on auditory skills referenced within the interviews. Final coding of auditory skills was shared with the two doctoral students to ensure consensus among the three coders.

Evidence of knowledge gained by either educational background or practice was included within the coding process. Third, interviews were coded using In Vivo coding, or coding for emotions and feelings, to honor the voices of the participants and highlight their lived experiences. Finally, new codes based on participant responses (Appendix F) were added as part of the open-coding process after all other coding was completed. Codes were combined to generate a set of themes that are common across and within participant groups. Interviews were audio-recorded and then destroyed after transcription was completed.

NVivo 11® was used to assist in identification of themes present in the interviews. NVivo 11® is a widely-used qualitative data analysis computer software package specially designed to analyze large volumes of qualitative data and is commonly used by government agencies and universities for large-scale research projects.

**Trustworthiness.** Generalizability and reliability are characteristic of the quantitative field of inquiry. This research does not generalize to other groups. A strength of qualitative research is the credibility of a qualitative study (Creswell, 2011). Credibility in this study was established through: (a) member-checking; (b) rich descriptions; (c) clarification of bias that the researcher brought to the study through the process of self-reflection. Once transcribed, participants were asked to review their transcript as a means of member-checking prior to analysis. Saldaña (2013) defined member-checking as the process of consulting with interview participants during analysis as a method of validating the findings. Once transcripts were verified by participants, the researcher, and two additional researchers, who are doctoral students at VCU, coded the interviews based on the developed coding system, as described above, the audio-recordings were erased. Coding was compared for consensus prior to data being erased or

analyzed. Interviews were checked for disconfirming evidence. To honor the voices of the participants, rich descriptions including direct quotes were used.

**Role of the Researcher.** Creswell (2011) stated that it is important for the researcher to establish all biases, values, and assumptions when conducting qualitative research. The researcher has an advanced certification from the AG Bell Association for the Deaf/Hard-of-Hearing. The researcher obtained the Listening and Spoken Language Specialist Certification in Auditory-Verbal Therapy in 2004. This certification required extensive training and practice in both caregiver coaching and auditory skill development. As such, the researcher is biased toward children with hearing loss being given the opportunity to use listening and spoken language to the greatest extent possible according to their individual differences. The data collection section describes steps taken to ensure that the bias of the researcher is controlled through the interview process and subsequent data analysis.

### **Mixed Method Data Analysis Procedures**

The mixed-methods questions ask, ‘In what ways do the experiences of EI providers explain their perceptions of caregiver coaching and auditory skills development?’ and ‘How do the ASHA, CEC, and AG Bell standards influence any differences between the beliefs of EI providers regarding caregiver coaching and auditory skill development?’ The data analysis that answered the final research questions for this study is described below.

The professional standards for each of the groups of participants were analyzed using qualitative document analysis. The requirements from each organization were compared to each other as well as to participant responses from the surveys and interviews (Biklen & Bogdan, 2007). The data from the document analysis was used as a comparison to the lived experiences of the participants. This information assisted in answering the mixed methods research question

‘How do the ASHA, CEC, and AG Bell standards influence any differences between knowledge and caregiver coaching of varied service providers?’ Qualitative themes from participants are displayed jointly with quantitative results (*Figure 6*). The quantitative and qualitative results are linked to further explain the similarities and differences between Teachers for the Deaf/Hard-of-Hearing, Speech-Language Pathologists, and Developmental Specialists educational backgrounds and their views of caregiver coaching regarding auditory skill development.

Data from the interviews and document analysis were compared to systems change theory as proposed by Ambrose (1987) to generate where training needs exist (*Figure 1*) and generate future directions for training using the Train-the-Trainer model. Using multiple sources of data including interviews and document analysis adds clarity to the information provided from the initial quantitative surveys.

### **Ethical Considerations**

This research relied on the participation of human subjects and received Institutional Review Board approval on May 8<sup>th</sup>, 2017 at VCU. Safety measures to ensure the confidentiality of data were taken at every phase of this study. Information about the purpose of the study and consent was obtained prior to collecting any data. Surveys were completed using a secure on-line system, VCU REDCap®. REDCap® is a web-based application used to administer surveys specifically for research projects, and it is compliant with the Health Insurance Portability and Accountability Act (HIPAA). Data transferred to SPSS® 24 software were stored on password protected external hard drives. Interviews were collected and digitally audio recorded. Audio recordings from the surveys were stored on encrypted jump drives. The researcher used pseudonyms for participants to maintain confidentiality and all recordings were disposed of after

transcription. Participants were informed of privacy and confidentiality measures taken throughout the study.

### **Institutional Review Board**

Approval from the Institutional Review Board (IRB) of Virginia Commonwealth University was sought prior to beginning data collection because this research involved human subjects. The study qualified for exemption under category 2 (IRB HM20006097).

### **Summary of Methodology**

The purpose of this mixed-methods investigation was to examine the relationship between the EI provider's background, characteristics of caregiver coaching and reported use of auditory skill development to develop professional development programs for providers that work with children with hearing loss and families that have chosen spoken communication methodologies. This research used an explanatory sequential design comprising a survey and participant interviews to represent the variability of all participants. This study is a first step in addressing the gaps in the literature by identifying the critical professional development needs of EI providers in Virginia working with a low incidence population.

## Chapter IV

### **Results**

The purpose of this research was to examine the relationship between Early Intervention (EI) provider's backgrounds and their knowledge of characteristics of caregiver coaching and auditory skill development to develop professional development programs for providers who work with children with hearing loss whose families have chosen spoken communication methodologies. An explanatory sequential design method was used to explore research questions in two distinct phases. Analysis of the first phase grouped participants into representative categories of the population. Participant interviews of members of these groups comprised the second phase with analysis of the findings from both phases combined to address the mixed method research question. The following results address the six research questions that guided this study.

#### Phase One: Quantitative Research Questions

RQ1: How do participants' educational backgrounds relate to their comfort providing caregiver coaching?

RQ2: How do participants' educational backgrounds relate to their comfort with intervention targeting auditory skill development?

## Phase Two: Qualitative Research Questions

RQ3: What are EI providers' perceptions regarding their educational background and professional experiences with caregiver coaching as applied to auditory skill development?

RQ4: How are EI providers' beliefs influenced by the family-child outcome requirements when providing coaching to families regarding communication development?

## Mixed-Method Research Questions

RQ5: In what ways do the experiences of EI providers explain their perceptions of caregiver coaching and auditory skills development?

RQ6: How do the ASHA, CEC, and AG Bell standards influence any differences between the beliefs of EI providers regarding caregiver coaching and auditory skill development?

Quantitative data analysis revealed the relationship between early intervention providers' backgrounds, their comfort with auditory skills and caregiver coaching, and the differences between providers based on their professional designations as measured by the surveys. Analysis of interview data revealed how their educational backgrounds influence their beliefs and contextual factors that influence their service delivery. The mixed methods analysis combined data to explain how the experiences and standards of EI professionals explain their perceptions of caregiver coaching and auditory skill development.

## **Data Management and Data Reduction**

The survey was distributed via email to 2,524 Part C EI providers in the state with an email reminder sent two weeks after the original email. 102 participants completed the survey with a response rate of 4.04%. Sixty-four respondents met inclusion criteria for participation.

The sixty-four participants indicate a response rate of 2.54% of those surveyed and 62.7% of the original respondents. The survey consisted of four sections: (a) Demographics; (b) Preparation and Training; (c) Self-assessment of Caregiver Coaching; and (d) Self-assessment of Auditory Skill Development. There were nine demographic questions followed by 12 questions regarding training and preparation including specific coursework in undergraduate and graduate programs. The self-assessments of Caregiver Coaching and Auditory Skill Development used a Likert Scale of 1 (no comfort) to 5 (high-level of comfort).

The researcher screened the survey data for outliers and missing values. Partial surveys were included if participants indicated their respective degrees, experience working in EI, and comfort in providing services in the various communication methodologies ( $n = 64$ ). There was one questionable survey response detected for both the auditory skills comfort items and the caregiver coaching items. When the data were visually screened, the respondent had indicated a 5 (i.e., expert) for all items in each section. Because the respondent answered the same for the foil questions regarding a traditional model of early intervention as they did for the caregiver coaching model, indicating they were not meaningfully responding to the survey (Fowler, 2013), their data were excluded from the final analysis. The demographic information for EI providers for children with hearing loss in Virginia was unknown prior to this research. Therefore, the demographic data for this participant was included; but, responses were excluded from the comfort score analyses. As such, the sample decreased from 64 to 63 after the demographic information was compiled, and from 24 to 23 within the developmental specialist professional designation.

Missing data were managed using listwise and pairwise deletion for each computation. Pairwise deletions were used for correlational statistics so that no data were excluded when

computing each of the merged variables. Researchers have estimated that biases are minimized if less than 20% of cases are excluded by listwise deletion (Arbuckle, 1996; Peng, Harwell, Liou, & Ehman, 2006). As shown in Table 7, the total percentage of surveys with missing data met the 20% requirement representing each stakeholder group for the comfort score analyses.

Table 7

*Stakeholder Groups and Missing Data*

Stakeholder Groups	Total surveys ( <i>n</i> )	Partial surveys ( <i>n</i> )	Complete surveys ( <i>n</i> )	Missing data (%)
TDHH	9	1	8	11.1
SLP	13	2	11	15.4
Developmental Specialists	24	4	20	16.7
LSLS AVT	2	0	2	0
Other	15	2	13	13.3
Total	63	9	54	14.3

*Note: TDHH -- Teachers for the Deaf or Hard of Hearing; SLP -- Speech Language Pathologist; LSLS AVT -- Listening Spoken Language Specialist Auditory-Verbal Therapists*

### Survey Constructs

Construct validity information was provided in chapter three for auditory skills and caregiver coaching and included the survey being reviewed by current EI providers in each of the demographic categories. Survey items addressing self-assessments were grouped based on constructs within caregiver coaching in four categories. These included: (a) characteristics of caregiver coaching; (b) characteristics of traditional model of service delivery; (c) language facilitation techniques; and (d) caregiver coaching strategies based on the adult learning models.

The survey required participants to indicate if each item was a construct they used: (1) never, (2) seldom, (3) sometimes, (4) frequently, or (5) always. Each item was then combined with other pre-determined items within that given construct. Table 8 shows examples of survey items merged to create each of the categories for caregiver coaching. The final constructs of characteristics of caregiver coaching, language facilitation techniques, and caregiver coaching strategies for adult learning were merged to derive an overall Caregiver Coaching Comfort Score. The items under the construct of characteristics of a traditional service delivery model were placed in the survey as a foil to ensure participants were engaged meaningfully with the survey rather than providing random answers.

Table 8

*Caregiver Coaching Constructs*

Construct	Examples of Items Included
Characteristics of Caregiver Coaching	<ul style="list-style-type: none"> <li>• Focus on caregiver-child interactions</li> <li>• EI sessions provided in the home</li> <li>• Focusing on family routines</li> <li>• Use materials available in the home</li> </ul>
Characteristics of Traditional Model	<ul style="list-style-type: none"> <li>• Directly working with child when the parent is not present</li> <li>• Bringing in materials to use during the EI session</li> </ul>
Language Facilitation Techniques	<ul style="list-style-type: none"> <li>• Open-ended questions</li> <li>• Parallel talk</li> <li>• Expansion</li> <li>• Linguistic mapping</li> <li>• Wait time</li> </ul>
Caregiver Coaching Strategies for Adult Learning	<ul style="list-style-type: none"> <li>• Direct modeling of strategies followed by guided practice</li> <li>• Guiding parents through activities</li> <li>• Observing the child-caregiver interactions</li> </ul>

Survey items on self-assessment of auditory skills were grouped on constructs based on models of auditory skill development including: (a) detection; (b) discrimination; (c) identification; (d) comprehension; (e) development; and (f) auditory development strategies. Table 9 shows examples of pre-determined items merged to create the categories of auditory skill development. Auditory skills do not develop in isolation. Therefore, an item could be included in two constructs. When this was the case, the construct was included under each subheading. For example, a child recognizing their name represents the skill of auditory detection, but also discrimination and comprehension. Finally, each of the constructs were merged to derive an overall Auditory Skill Development Comfort Score.

Table 9

*Auditory Skill Development Constructs*

Construct	Items Included
Detection	Sound awareness Detection of environmental noises Detection of the Ling 6 sounds
Discrimination	Response to name being called Discrimination of critical elements Auditory feedback
Identification	Identification of objects by description Closed and open set discrimination
Comprehension	Sequencing of directions Learning to listen sounds Response to name being called
Development	Consonant development through audition Speech acoustics and the impact on development
Auditory Development Strategies	Strategies for making acoustic signal salient Use of acoustic highlighting

## **Quantitative Phase**

The quantitative phase consisted of a survey sent to early intervention providers in Virginia. Participant descriptions, quantitative data analysis, and a summary of results are presented.

### **Participants**

Of the 2,524 early intervention providers who were sent the survey, 102 participants completed the survey with a response rate of 4.04%. Participation criteria required that they meet discipline-specific requirements, have previously completed online training modules through the Infant & Toddler Connection of Virginia (ITC), have passed the competency assessments for each area, and have completed the application process for becoming an early intervention provider in Virginia. All early intervention professionals in Virginia were sent the survey by the project director of the ITC, and the survey was also distributed to each of the 40 Central Points of Entry contacts. The number of professionals who provide services to children with hearing loss in the EI system in Virginia was unknown prior to this research.

Participants who did not indicate their respective degrees or professional designations, their experience working in EI, and comfort in providing services in the various communication methodologies were removed from the study ( $n = 37$ ) as this information is essential in answering the research questions. Sixty-five professionals indicated that they have worked with children that have a hearing loss since receiving their perspective degrees with 63 of those having done so within the past five years. One participant indicated they are not open to working with this population and they were excused from completing the rest of the survey. Therefore, there were 64 participants meeting inclusion criteria indicating a response rate of 2.54% of those

surveyed and 62.7% of the original respondents meeting criteria for inclusion. Demographic data for eligible participants is depicted in Table 10.

Table 10

*Demographic Characteristics of Participants (n = 64)*

	Sample (n)	Percent (%)
<b>Professional Designation</b>		
Teacher for the Deaf/Hard-of-Hearing	9	14.1
Speech-Language Pathologist	13	20.3
Developmental Specialist	24	37.5
Auditory-Verbal Therapist	2	3.1
Other	16	25
Occupational Therapist	1	1.6
Physical therapist	8	12.5
Educational audiologist	1	1.6
Licensed clinical social worker	1	1.6
Service coordinators	4	6.3
Supervision consultant	1	1.6
<b>Educational Background</b>		
Bachelor's	13	20.3
Master's	38	59.4
Post-graduate professional training	10	15.6
Doctorate	3	4.7
<b>Professional Certifications and Licensures</b>		
ASHA Certificate of Clinical Competence	23	28.1
Council on Education of the Deaf	4	6.3
Teacher licensure in Virginia	29	40.6
Listening and Spoken Language Specialist	2	3.1
National Teacher Certification	3	4.7
Virginia Department of Health Professions License	31	37.5
Other	28	34.4
<b>Total Experience</b>		
1 - 5 years	9	14.1
6 - 10 years	6	9.4
11 - 15 years	7	10.9
16 - 20 years	10	15.6
21 +	32	50.0
<b>Early Intervention Experience</b>		
1 - 5 years	15	23.4
6 - 10 years	13	20.3

	11 – 15 years	10	15.6
	16 – 20 years	9	14.1
	21 +	17	26.6
Hearing-Impairment Experience			
	Less than a year	1	1.56
	1 - 5 years	22	34.4
	6 – 10 years	10	15.6
	11 – 15 years	5	7.8
	16 – 20 years	7	10.9
	21 +	19	29.7

Respondents represented all geographic areas of Virginia as defined by the Virginia Department of Education (Table 11). However, the percentages of professionals are likely not representative of the numbers of children identified with hearing loss in each of these areas considering there was only one respondent from Northern Virginia. Additionally, only 17% of the participants indicated the area of Virginia in which they provide services ( $n = 53$ ).

Table 11

*Areas of Virginia Represented by Participants*

Areas	Frequency	Percent
Shenandoah Valley	9	17
Richmond	14	26.4
South Central	8	15.1
Northern Virginia	1	1.89
Southwest	11	20.6
Tidewater	12	22.6

**Professional Preparation of Participants**

Table 12 depicts the wide range of coursework and experiences participants received during their graduate training. Over 64% of participants did not have coursework in basic audiology. Furthermore, almost 58% of the participants did not have any lectures or coursework on aural habilitation during their graduate careers, but are now working with children who have a

hearing loss. However, 53.7% of participants observed children with hearing loss during their graduate/undergraduate clinics or externships. Only 37% of participants completed these observations in the early intervention system.

Table 12

*Participant Experiences in Graduate Program Coursework*

Course	None (%)	Entire Course (%)	Workshop (%)
Listening and Spoken Language	70.3	10.9	7.8
Cochlear Implants and Hearing Aids	68.8	10.9	1.6
Auditory Strategies	67.2	10.9	7.8
Caregiver Coaching	67.2	12.5	4.7
Audiology	64.1	28.1	6.3
Auditory Skill Development	64.1	9.4	6.3
IDEA Child and family performance indicators	64.1	6.3	1.6
Aural Habilitation	57.8	15.6	3.1

*Note: IDEA -- Individuals with Disabilities Education Act*

The Developmental Specialists indicated that they did not have coursework in their graduate preparation programs in audiology, aural habilitation, auditory skill development, cochlear implants, or FM systems. However, 8.3% of the Developmental Specialists reported that they did have coursework in Listening and Spoken Language (LSL). There is a strong possibility that participants who responded that they had coursework in LSL did so because they had coursework in language development. These two areas of coursework are not equitable. Listening and Spoken Language courses are highly specialized and only offered at a few of the

TDHH and SLP programs in the country (Dolman, 2010; oral deaf Education, 2008). Almost 18% of the Developmental Specialists received an entire course on caregiver coaching and one course on the Individuals with Disabilities Education Act (IDEA) regulations. This compares to only 9.1% of the Teachers for the Deaf/Hard-of-Hearing (TDHH) who received a course in either of these areas. None of the Speech-Language Pathologists (SLP) received an entire course on IDEA and only 7.7% of them received an entire course in caregiver coaching.

Overall, 37% of the participants had little to no confidence that their college experiences prepared them to provide services to children with hearing loss in the early intervention system. This is similar to the 37.1% who felt prepared or very prepared to provide services to this population. When broken down into the categories of professionals certified by the American Speech-Language Association (ASHA) versus Developmental Specialists, 57.2% of the ASHA certified professionals were confident in their training compared to none of the Developmental Specialists feeling confident in the training they received as part of their respective degree programs to provide services to children with hearing loss in early intervention.

Professional development and continuing education are required to maintain all the certifications of the survey participants. Professional development experiences such as workshops or seminars attended in critical areas for working with children who have a hearing loss have been identified in the literature and were included in the survey. Responses of participants are included in Table 13.

Table 13

*Post-graduate Professional Training Completed*

Areas of Training	Percent (%)
Caregiver coaching	88.9
Child and family performance indicators of IDEA Part C	79.6
Cochlear implant technology or assistive technology	57.4
Auditory skill development	50.0
Auditory-oral communication options including listening and spoken language	48.1
Habilitation/Rehabilitation strategies for children with hearing loss	38.9

*Note: IDEA -- Individuals with Disabilities Education Act*

Participants also indicated where they desired continued professional development. Areas of desired professional development are included in Table 14. Survey participants were given an opportunity to indicate any additional areas where they would like to receive continuing education. One respondent indicated:

Technology continuously changes, info on CIs [cochlear implants], HAs [hearing aids] and FMs [Frequency Modulation assistive technology] is always important; caregiver coaching was always used, but I don't think I've had formal training in this, only have read articles. Many TODHH [Teachers of the Deaf/Hard-of-Hearing] have worked with school aged children, but not with infants and toddlers and their families, so need special training to provide EI services.

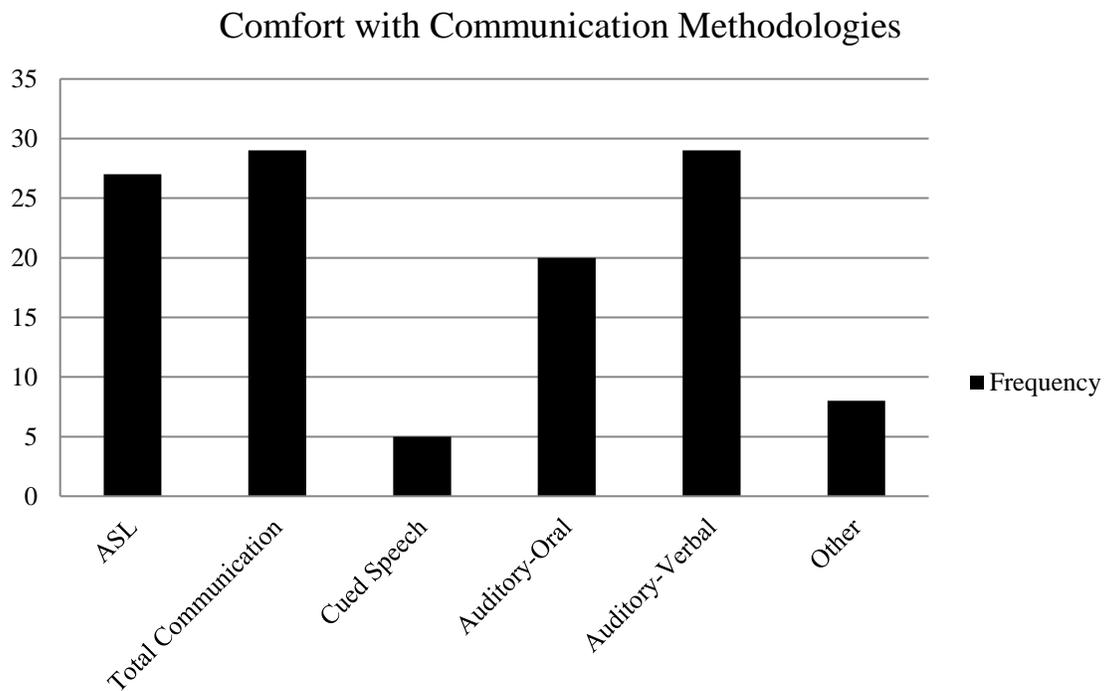
Another suggestion from a respondent included training on the impact of the hearing loss on a family system with emphasis on social and emotional development, performance indicators, and how to troubleshoot all the technology used by children with hearing loss.

Table 14

<i>Desired Professional Development</i>	
Areas of Training	Percent (%)
Auditory strategies	90.8
Cochlear implants and hearing aids	88.9
FM systems	83.3
Aural habilitation	83.3
Listening and Spoken Language	81.5
Auditory skill development	81.5
Caregiver coaching	70.4
IDEA	66.7

*Note: FM - Frequency Modulation; IDEA - Individuals with Disabilities Education Act*

At the beginning of the survey participants indicated any communication methodology they were comfortable using in working with families of children with hearing loss (*Figure 4*). More participants indicated that they were comfortable using auditory-verbal communication methodologies ( $n = 29$ ) than using American Sign Language ( $n = 27$ ) and there were eight participants that were not comfortable in either methodology. The number of participants comfortable using auditory-oral techniques was less than auditory-verbal ( $n = 20$ ) which is concerning because to be proficient at using auditory-verbal techniques, the provider must also have an in-depth understanding of auditory-oral methods (Erber, 1982; Estabrooks, 2012).



*Figure 4.* Participant comfort with communication methodologies.

### **Analysis of Quantitative Research Questions**

Data analysis was completed by comparing the mean and standard deviation for each of the constructs from caregiver coaching and auditory skill development for the total sample and for each professional designation, and are represented in Table 15. The construct components are represented in Tables 8 and 9 at the beginning of chapter four. Due to the limited number of certified LSLS that completed the survey ( $n = 2$ ) and the total number of those individuals in the state of Virginia ( $n = 11$ ) their identities could be compromised and therefore their data were not reported as a separate group, but calculated within the total for the entire group. Teachers for the Deaf/Hard-of-Hearing (TDHH) reported comfort scores for auditory skill development ( $M = 118.83$ ) one standard deviation ( $SD = 34.28$ ) higher than Developmental Specialists ( $M = 60.71$ ) and related service providers under the category of “other” ( $M = 52.75$ ). However, there were

three times as many participants who identified as Developmental Specialists ( $n = 23$ ) than TDHH ( $n = 9$ ). The TDHH were more comfortable with providing auditory skills when they may not be providing skills to this population of children within Virginia.

Data analysis was also conducted using non-parametric statistics including *Spearman's Ranked Correlational Coefficient* (Spearman's  $r_s$ ). Spearman's  $r_s$  allowed the researcher to examine the correlation between individual variables (ex. background, caregiver coaching behaviors, and knowledge of auditory skill development) without the data meeting the assumptions of the typically used *Pearson's Product-Moment Correlation*. Spearman's rank-order correlational coefficients of 0.10, 0.30, and 0.50 are, by convention, considered small (weak), medium, and large (strong) effect sizes respectively (Cohen, 1988). To answer the first and second research questions, a Spearman's correlation (aka *Spearman's rho*;  $r_s$ ) was calculated to determine the relationship between the participants' self-assessments of constructs related to auditory skill development and those related to caregiver coaching. A matrix is displayed in Table 16 for the entire group of participants. There was a strong positive correlation between language facilitation strategies and auditory identification ( $r_s = 0.521, n = 63, p = .007$ ) as well as auditory comprehension ( $r_s = 0.544, n = 63, p = .004$ ). Both of these values were statistically significant. There was a negative correlation between characteristics of caregiver coaching and the auditory skill constructs of detection, discrimination, identification, development, and comprehension. There was a weak positive correlation for the entire group between the larger constructs of auditory skill development and caregiver coaching ( $r_s = 0.254, n = 63, p = .016$ ).

Table 15

*Mean and Standard Deviation of Survey Measures for the Total Sample and for Professional Designations*

Survey Constructs	Group		TDHH		SLP		Developmental Specialists		Other	
	N = 63*		n = 9		n = 13		n = 23		n = 16	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Characteristics of Caregiver Coaching	37.31	4.54	36.14	3.24	33.86	5.01	38.78	4.49	39.13	2.95
Characteristics of Traditional Model	4.25	1.50	4.70	1.50	4.71	1.80	3.89	1.27	3.75	1.39
Language Facilitation Strategies	76.84	9.66	79.70	7.30	74.42	9.13	80.00	9.70	70.75	8.50
Caregiver Coaching Strategies for Adult Learning	25.34	3.23	26.50	2.27	22.43	3.60	26.89	2.57	25.00	2.78
<b>Caregiver Coaching Comfort Score</b>	<b>138.38</b>	<b>15.83</b>	<b>142.33</b>	<b>11.47</b>	<b>134.00</b>	<b>17.87</b>	<b>138.73</b>	<b>19.31</b>	<b>134.88</b>	<b>10.93</b>
Detection	11.00	4.94	17.38	2.26	13.00	4.04	8.78	2.68	7.88	2.36
Discrimination	15.17	7.30	23.25	4.13	19.29	4.60	12.67	4.06	10.25	3.41
Identification	15.58	6.87	22.00	4.75	19.71	4.23	14.11	3.33	11.12	3.98
Comprehension	13.38	5.65	18.88	3.48	16.57	3.30	12.56	3.13	9.25	3.41
Development	13.46	7.50	21.50	5.61	18.00	3.37	11.33	4.30	8.50	2.83
Auditory Development Strategies	9.10	4.84	15.13	2.59	11.29	2.56	7.11	2.31	5.75	1.39
<b>Auditory Skill Development Comfort Score</b>	<b>85.97</b>	<b>34.28</b>	<b>118.13</b>	<b>21.90</b>	<b>103.43</b>	<b>21.02</b>	<b>60.71</b>	<b>17.30</b>	<b>52.75</b>	<b>15.57</b>

*\*Listening and Spoken Language Specialists included in the total group, but not as a separate group due to confidentiality of participants*

Table 16

*Correlations Between Auditory Skill Development and Caregiver Coaching Comfort (n=63)*

	Characteristics of Caregiver Coaching	Language Facilitation Strategies	Caregiver Coaching Strategies
Detection	-.068*	.340*	.197
Discrimination	-.010*	.439*	.225*
Identification	-.098*	.521**	.293*
Comprehension	-.083*	.544**	.304*
Development	-.261*	.384*	.079
Strategies	.192	.351*	.146

Note. \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$

Correlations for Speech-Language Pathologists are displayed in Table 17. For this group, there was a significant and strong positive correlation between the characteristics of caregiver coaching and the auditory skill of identification ( $r_s = 0.599$ ,  $n = 13$ ,  $p = .025$ ). There was also a significant and strong positive correlation between caregiver coaching strategies and identification ( $r_s = 0.643$ ,  $n = 13$ ,  $p = .036$ ) and comprehension ( $r_s = 0.533$ ,  $n = 13$ ,  $p = .022$ ). Additionally, there was no correlation between the larger construct of auditory skill development and caregiver coaching ( $r_s = 0.090$ ,  $n = 13$ ,  $p = .041$ ).

Table 17

*Speech-Language Pathologists: Correlations Between Auditory Skill Development and Caregiver Coaching Comfort (n=13)*

	Characteristics of Caregiver Coaching	Language Facilitation Strategies	Caregiver Coaching Strategies
Detection	.185	-.156	.261*
Discrimination	.412*	.419*	.403*
Identification	.599*	.270*	.643*
Comprehension	.409*	.239*	.533*
Development	-.160	.025	-.184
Strategies	-.266*	-.248*	-.156

Note. \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$

In contrast to the entire group, there was a significant strong positive correlation between the larger constructs of auditory skill development and caregiver coaching ( $r_s = 0.803, n = 9, p = .046$ ) for Teachers for the Deaf/Hard-of-Hearing (TDHH). Table 18 depicts the correlations between auditory skill development and caregiver coaching for the TDHH. The significant correlations between caregiver coaching strategies with five of the six areas of auditory skill development indicate that TDHH are more comfortable providing caregiver coaching with regards to auditory skills than SLPs. This may be due to their in-depth knowledge and training during graduate school and continued professional development that is disability specific. However, it is concerning that these individuals may not be the professionals providing these services to children with hearing loss in early intervention in Virginia (e.g. see Table 10).

Table 18

*Teachers for the Deaf/Hard-of-Hearing: Correlations Between Auditory Skill Development and Caregiver Coaching (n=9)*

	Characteristics of Caregiver Coaching	Language Facilitation Strategies	Caregiver Coaching Strategies
Detection	.400*	.889**	.923**
Discrimination	.385*	.527*	.783*
Identification	.417*	.440*	.731*
Comprehension	.468*	.473*	.752*
Development	.444*	.352*	.629*
Strategies	.413*	.545*	.764*

Note. \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$

Developmental Specialists comprised 23 of the 63 total survey respondents. Correlations for Developmental Specialists are indicated in Table 19. Similar to the entire group, correlational coefficients between language facilitation strategies and identification ( $r_s = 0.624, n = 23, p = .026$ ) and comprehension ( $r_s = 0.710, n = 23, p = .042$ ) were strong and statistically significant. There was a significant strong positive correlation between characteristics of caregiver coaching

and auditory comprehension ( $r_s = 0.501, n = 23, p = .017$ ). There was a significant strong positive correlation for Developmental Specialists between the larger constructs of auditory skill development and caregiver coaching ( $r_s = 0.687, n = 23, p = .013$ ). This is similar to the positive correlation that existed for TDHH in the same areas.

Table 19

*Developmental Specialists: Correlations Between Auditory Skill Development and Caregiver Coaching (n=23)*

	Characteristics of Caregiver Coaching	Language Facilitation Strategies	Caregiver Coaching Strategies
Detection	.532*	.284*	.293*
Discrimination	.329*	.485*	.356*
Identification	.397*	.624*	.442*
Comprehension	.501*	.710**	.461*
Development	.140	.480*	.128
Strategies	.291*	.374*	.213*

Note. \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$

Finally, early intervention professionals who were not identified as SLPs, TDHH, or Developmental Specialists showed negative correlations between characteristics of caregiver coaching and all areas of auditory skill development indicating that they are more comfortable with caregiver coaching, but this comfort may not translate in practice to providing coaching in auditory skill development. These professionals indicated they were occupational therapists, physical therapists, educational audiologists, social workers, service coordinators, and supervision consultants. The correlations for this group are displayed in Table 20. The extent of their training in auditory skill development is limited as indicated in the first part of the survey regarding their graduate preparation. The correlation between overall caregiver coaching comfort and auditory skills was weak ( $r_s = .286, n = 16, p = .049$ ).

Table 20

*Other Professionals: Correlations Between Auditory Skill Development and Caregiver Coaching (n=16)*

	Characteristics of Caregiver Coaching	Language Facilitation Strategies	Caregiver Coaching Strategies
Detection	-0.13	.192	.271
Discrimination	-.135	.335*	.455*
Identification	-.221*	.359	.418*
Comprehension	-.185	.313*	.390*
Development	-.550	.293*	.161
Strategies	-.176	.737*	.677*

Note. \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$

### Summary of Quantitative Phase Results

Survey results from 64 early intervention providers in Virginia were analyzed during the quantitative phase of this study to address the first two research questions. First, the researcher used descriptive statistics to understand the training and preparation of EI providers that serve children with hearing loss in Virginia. EI providers' graduate preparation varied greatly with 37% of respondents not having confidence that their college experiences prepared them to provide EI services to children with hearing loss. However, 53.7% of participants observed children with hearing loss during their graduate/undergraduate clinics or externships. Only 37% of participants completed these observations in the early intervention system. Post-graduate professional development was highest for caregiver coaching and IDEA followed by cochlear implant technology. The most desired professional development included auditory strategies followed closely by cochlear implant and FM technology.

Second, the researcher wanted to determine how participants' educational backgrounds relate to their comfort in providing caregiver coaching as well as auditory skill development. Teachers for the Deaf/Hard-of-Hearing (TDHH) reported comfort scores for auditory skill

development ( $M = 118.83$ ) one standard deviation ( $SD = 34.28$ ) higher than Developmental Specialists ( $M = 60.71$ ) and related service providers under the category of “other” ( $M = 52.75$ ). Overall, TDHH showed a significant positive correlation between their comfort with auditory skill development and caregiver coaching. Although not statistically significant, there was an overall negative correlation between the characteristics of caregiver coaching and the constructs identified within auditory skill development for the group as well as EI professionals in the “other” category comprising related service providers.

### **Qualitative Phase**

The qualitative phase consisted of participant interviews followed by qualitative document analysis. Participant descriptions, qualitative data analysis procedures, reliability and credibility, participant and group themes are presented followed by a qualitative document analysis of regulatory documents for each of the participant groups.

### **Participants**

Nine EI professionals, representing each of the three main categories of professionals from the surveys, were interviewed. Participants indicated during the survey their willingness to complete an interview and were chosen based on their professional designations as well as self-assessments of comfort with caregiver coaching and auditory skill development. Table 21 describes the demographic characteristics of EI professionals interviewed. The means and standard deviations of comfort scores for caregiver coaching and auditory development for each of the interview participants were compared (e.g. see Tables 22 and 23). The total comfort scores were derived from responses to each of the areas within each construct using a Likert Scale of (no comfort) to 5 (high-comfort). Interviews were coded by the researcher for demographic information including their professional designation, graduate training, experience in working

with children who have a hearing loss, and experience in working in early intervention. During the member-checking process any inconsistencies or questions regarding these areas were clarified. This occurred after all the interviews and transcriptions were completed.

Table 21  
*Demographic Characteristics of Interview Participants*

Pseudonym	Professional Designation	Graduate Training	Experience in DHH	Experience in Early Intervention	Coaching Comfort Score	Auditory Comfort Score
Warren	Dev. Spec.	Virginia	29 years	2 years	144	133
Carol	Dev. Spec.	Not VA	5 years	11 years	102	33
Helen	TDHH/D.S.	Not VA	22 years	12 years	135	124
Dan	TDHH	Virginia	35 years	15 years	139	91
Jane	TDHH	Virginia	41 years	2 years	140	118
Todd	SLP	Virginia	1 year	1 year	126	85
Kathryn	SLP	Not VA	16 years	16 years	170	155
Judy	SLP	Virginia	2 years	2 years	127	124
Doreen	SLP	Virginia	28 years	3 years	124	119

*Note: TDHH -- Teachers for the Deaf or Hard of Hearing; SLP -- Speech Language Pathologist; LSLS AVT -- Listening Spoken Language Specialist*

Table 22

*Participant Auditory Development Comfort Scores Compared to Entire Group and Professional Designation*

Participant	Auditory Comfort Individual Score	Score for Entire Group	Score for Professional Designation
		Auditory Comfort Score difference in participant mean from entire group	Auditory Comfort Score difference in participant mean from their own professional designation
Group	$\bar{x}$	M=85.97 SD = 34.28	M=60.71 SD = 17.30
Warren (Dev. Spec)	133	47.03	72.29
Carol (Dev. Spec)	33	-52.97	-27.71
Helen (TDHH/Dev.Spec)	124	38.03	63.29
Group			M=118.13 SD = 21.90
Dan (TDHH)	91	5.03	-27.13
Jane (TDHH)	118	32.03	-.13
Group			M=103.43 SD = 21.02
Todd (SLP)	85	-.97	-18.43
Kathryn (SLP)	155	69.03	51.57
Judy (SLP)	124	38.03	20.57
Doreen (SLP)	119	33.03	15.57

*Note: TDHH -- Teachers for the Deaf or Hard of Hearing; SLP -- Speech Language Pathologist; LSLs AVT -- Listening Spoken Language Specialist Auditory-Verbal Therapists*

Table 23

*Participant Caregiver Coaching Comfort Scores Compared to Entire Group and Professional Designation*

Participant	Caregiver Coaching Comfort Individual Score	Score for Entire Group	Score for Professional Designation
		Caregiver Coaching Comfort Score difference in participant mean from entire group	Caregiver Coaching Comfort Score difference in participant mean from their own professional designation
Group	$\bar{x}$	M=138.38 SD = 15.83	M=138.73 SD = 19.31
Warren (Dev.Spec)	144	5.62	5.27
Carol (Dev.Spec)	102	-36.38	-36.73
Helen (TDHH/Dev.Spec)	135	-3.38	-3.73
Group			M=142.33 SD = 11.47
Dan (TDHH)	139	0.62	-3.33
Jane (TDHH)	140	1.62	-2.33
Group			M=134.00 SD = 17.87
Jean (SLP)	126	-12.38	-8
Kathryn (SLP)	170	31.62	36
Judy (SLP)	127	-11.38	7
Doreen (SLP)	124	-14.38	10

*Note: TDHH -- Teachers for the Deaf or Hard of Hearing; SLP -- Speech Language Pathologist; LSLs AVT -- Listening Spoken Language Specialist Auditory-Verbal Therapists*

## **Interview Data Analysis**

Participant interviews ( $N = 9$ ) served as the principal data source and qualitative analysis through an iterative coding process to address research question number three: ‘What are EI providers’ perceptions regarding their educational background and professional experiences with caregiver coaching as applied to auditory skill development?’ Additionally, qualitative data analysis answered research question number four: ‘How are EI providers’ beliefs influenced by the family-child outcome requirements when providing coaching to families regarding communication development?’ Reliability and credibility of the coding process and data analysis are presented followed by results for each research question.

**Reliability and credibility.** Reliability in qualitative research consists of the stability of the coding scheme, accuracy, and intercoder reliability and agreement (Campbell, Osserman, Pendersen, & Quincy, 2013). The development of a priori codes established a stable coding scheme as the basis for hypotheses coding. The primary researcher and two Virginia Commonwealth University (VCU) doctoral students completed coding separately coming together after all coding was completed for comparison. Intercoder reliability or agreement was calculated for approximately 20% of the total interviews. This was completed by using one page randomly selected from each of the interviews. The transcripts totaled 47 pages with nine pages used for intercoder reliability. The intercoder reliability was calculated by dividing the number of coding agreements by the number of agreements and disagreements combined. Initial coding agreement between the primary researcher and second rater was calculated at 72% and between the primary researcher and the third rater at 57%. Krippendorff (2004) stated that 70% agreement is an acceptable level. Many of the coding disagreements centered on specific auditory skills such as discrimination, comprehension, or identification. The auditory skills referenced in

interviews were again coded by an early intervention specialist with extensive experience in auditory skill development in conjunction with the primary researcher and consensus was reached on all codes for content-specific knowledge. Open codes were added by each of the coders and added to the codebook with consensus on new codes reached.

The researcher enhanced the credibility of the interviews through member-checking (Maxwell, 2013). This was completed verbally, over the phone, with each of the interview participants. Participants were given the opportunity to review transcripts of their interview to add clarification or feedback. There were no discrepancies or disagreements reported with any of the transcripts. Additionally, participants were sent a list of themes present in the interviews through qualitative data analysis and contacted via telephone to document any additional questions or concerns. Once again, there were no concerns and it can be assumed that the data analysis was credible to the lived experiences of the participants. The researcher sought clarification from one participant regarding their interview to expand on their own communication bias. This is addressed in the analysis of qualitative data.

**Participant group themes.** The researcher used hypothesis coding and open coding to understand how EI providers integrate caregiver coaching in conjunction with auditory skill development and the influences of the child-family outcome requirements. In Vivo coding added deeper meaning to the interviews by capturing the lived experiences of the participants and their feelings regarding critical issues. The resulting data provided a broader context for understanding the depth of their understanding within the context of evidence-based practices and the family-child outcome requirements of IDEA Part C. *Figure 5* depicts coding themes present in qualitative analysis of interviews organized by professional designation and for the entire group of participants interviewed.

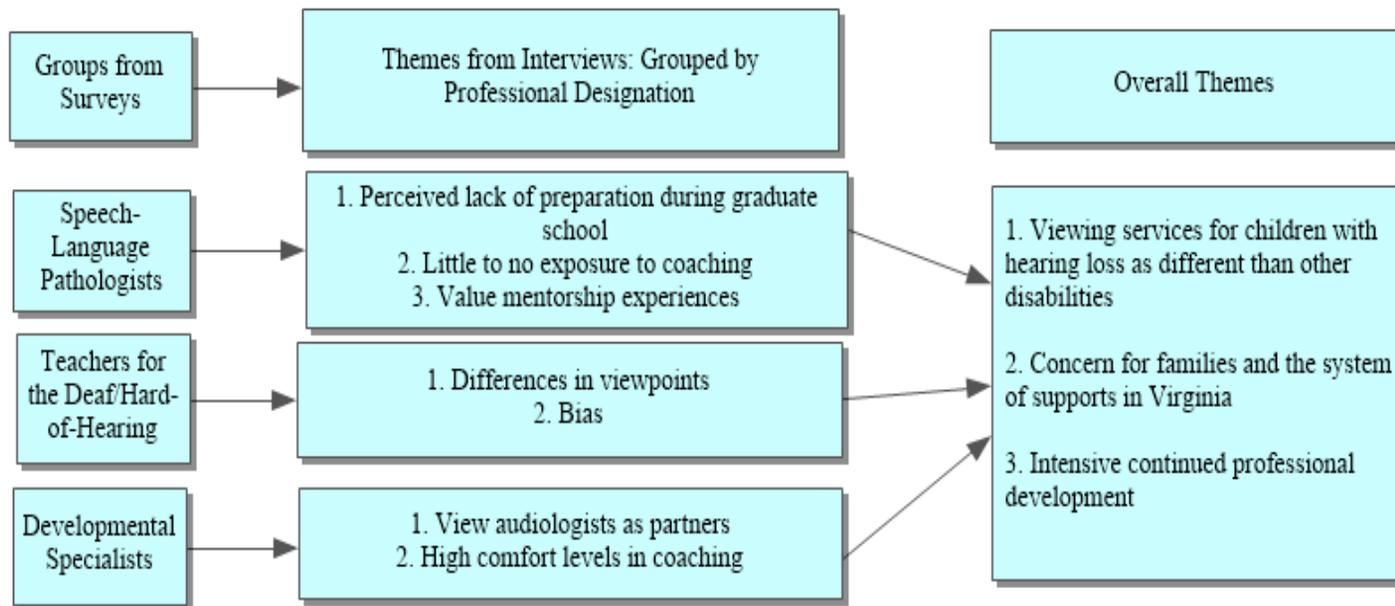


Figure 5. Themes present in qualitative interviews.

*Speech-Language Pathologists.* Speech-Language Pathologists (SLP) discussions of their graduate programs and experiences illustrated the specific needs of professionals working with children who have a hearing loss. SLPs expressed they received very little direct experience in graduate school with this population in addition to limited exposure to caregiver coaching making their current positions difficult at first. They also valued mentorship experiences as a valuable tool for being able to provide quality services to families and increase their own comfort levels.

Participants were asked about how their graduate programs prepared them for working in early intervention and children with hearing loss. Judy stated her only course to prepare her in working with children that have a hearing loss was an audiology course taken in her undergraduate program. As a licensed SLP, the American Speech-Language Hearing Association (ASHA) requires aural habilitation. Although she met the course requirement, she reported that it was not beneficial for working with children who have cochlear implants and using Listening and Spoken Language (LSL). Each of the children she works with currently have cochlear implants or high-powered hearing aids and their parents have chosen LSL as the communication modality for their child. Judy also stated that while she met the aural habilitation course requirements, she was not prepared to work with this population. This is illustrated in her description of her comfort level in working providing LSL:

On a scale of 1 to 10? I'm not very comfortable with it actually. The graduate class was no help at all. I hadn't had any kids – I had one kid at the school that had hearing aids, but other than that I've had no experience with kids with cochlear implants and when I got a kid for early intervention, that is when I contacted (cochlear implant team therapist) because she was already seeing her.

Todd expressed his comfort level in this way:

I am moderately comfortable. I would feel comfortable providing services to the children and explaining to the parent what I am doing in terms of acoustic highlighting.

Todd indicated that he had one clinical placement working directly with children who have hearing loss that contributed to his comfort level with this population.

Doreen had the most years of experience and reported a high comfort level in working with children that have a hearing loss using LSL and for using caregiver coaching. She had insight into the changes in the field and reflected on her own career:

Cochlear implants – I don't even think it was mentioned. It was a fleeting thing they were doing in some other land. It was not something. We didn't really know anything about [cochlear implants]. So once probably 3 or 4 years in and I had my first child with a CI [cochlear implant] and it was like wow – wow you know I spent a lot of time trying to figure out what I needed to do you know what kind of things. I wanted to learn and I had parents working with an auditory-verbal therapist come and say well she tells me to sit behind him and whisper and that makes no sense to me. I don't understand what is going on so.

There was one SLP, Kathryn, who received her education outside of Virginia. She benefited from extensive graduate training in working with children who have hearing loss with regards to coursework and clinical placement using a coaching model. However, she did not work with children under the age of three. She also had a high comfort level in working with the coaching model and with LSL. Her reflections on her training and the field echo the sentiments of Doreen:

While I may have come out of graduate school with theory, I did not work with a child that was under the age of – maybe four. That just shows how the field has changed. We

are getting these kids amplified earlier and getting them to services. Even the coaching has changed. You learn to work with families of young ones because of those changes. I think now it may be different for new grads because when I was in school, it was just as Universal Newborn Hearing Screening was being passed. The opportunity to work those kids just wasn't possible. Now – it should be common practice.

Todd expressed an interest in working with children who have a hearing loss during graduate school and had to seek out a final clinical placement to extend that interest without the guidance from the graduate program. Todd reported that he was told to start making calls to cochlear implant centers and if there was one willing to mentor a student, then the graduate school would assist him. He stated, "I had maybe one or two lectures on it [coaching] but not a lot. I got most of my information through my last clinical placement." Todd stated:

That mentorship increased my comfort level. I feel fortunate enough that I got to work with [cochlear implant center] and see it first-hand. You have to go out there yourself if you are interested in it and seek it out.

Todd's training on coaching was echoed by Judy who indicated, "I wasn't provided this type of training in undergrad or graduate or any of my extern/internships." Judy stated that she wanted to back up and take a course on cochlear implant technology, hearing loss, and auditory verbal therapy. She saw value in having specialty training and expressed:

There is no laws or standard that says I can't provide therapy to a child with a hearing loss because I am a Speech Pathologist, but there is nothing that says I have to have training in auditory verbal therapy but I think there should be...according to early intervention standards, a developmental therapist with no background [in listening and spoken language] can see a child with a hearing loss.

Todd also discussed the implications of not being required to have a pre-determined number of hours in working with children who have a hearing loss and their families. Instead of every graduate student having some exposure to this population, he stated that students are at the “mercy of their clinical placements.” One student may have a placement with an emphasis on LSL while another student may never see a child with cochlear implants.

Each of the SLPs illustrated that their graduate programs may not have prepared them, but they utilized their resources and community of professionals to guide their practice through mentorships regardless of their years of experience. These mentorships and collaborations consisted of working with therapists employed with various cochlear implant teams throughout the state that were providing services to shared families on their caseloads. Judy illustrated this by saying, “they [Early Intervention regulations] don’t require it, but I do attend most of his mapping and auditory verbal sessions - I have for the last two years.” She continues to describe her relationship with the therapist on the cochlear implant team by saying:

She gives me a lot of resources and she leads me in the right direction on how that type of therapy is different from the therapy that I do every day. She helps me problem solve, like I will say “hey, we’ve been working on this, vowel and consonant sounds for months and he just can’t get an S sound.” And, she helps me problem solve and see what the child is doing, what the child isn’t doing that we want to work on next. So, she’s really good at guiding me in the right direction and answering my questions.

Doreen revealed her own reliance on a therapist at one of the cochlear implant teams. She stated, “They are so willing to share their knowledge.” This extended to sharing therapy plans and consulting regularly with one another on specific goals. Doreen discussed having a close working relationship with one of the therapists on the cochlear implant team by speaking several

times a week by phone, faxing therapy notes, consulting on situations in the home, and discussing changes to Individualized Family Services Plans (IFSP) and Individualized Education Plans (IEP).

Taken together, the SLPs felt ill-prepared through their graduate programs and needed mentorship experiences to become comfortable with not only providing services to children with hearing loss using LSL, but also in providing caregiver coaching with regards to auditory skill development. However, these mentorship experiences are not formal, nor required for their positions in early interventions; but, they developed organically out of a mutual care for the families.

*Teachers for the Deaf and Hard-of-Hearing.* There were three professionals interviewed that identified as Teachers for the Deaf and Hard-of-Hearing (TDHH) with one also identifying as a Developmental Specialist. She identified herself for the survey as a TDHH, but clarified during the qualitative interview that she serves in both capacities equitably. Therefore, Helen's information is included in both sections to honor her own identification in both specialties. TDHH professionals displayed a wide discrepancy in several viewpoints, but all were knowledgeable of the initiatives and needs across the state.

The TDHH had a great deal in common. They reported extensive knowledge and professional development since completion of their graduate programs. These are described in depth during the descriptions of overall themes as this was evident not only with TDHH, but with all interviews. Additionally, two of the TDHH interview participants were educated in Virginia and work in rural areas on opposite sides of the state. They each provide services within the public schools (Part B of IDEA) and in early intervention (Part C of IDEA).

However, the TDHH differed in their frustration levels, collaboration practices, and knowledge of auditory skill development and caregiver coaching. Jane expressed frustration in believing that she is qualified to offer services and not being able to connect easily with those families that need her expertise. Jane stated:

I know the kids are out there. Basically, one of the infant toddler providers wrote to me and said they like to use their own staff, but if I could get listed with Medicaid they may use me, but still I have not heard anything yet. That was this year.

Consequently, Jane did become a Medicaid provider, located in a rural area, reached out to multiple agencies within driving distance of her home, and has not been contacted this year to provide services for any children or families. She also is a level three sign-language interpreter and feels she can provide services to a family regardless of their communication choices. She also expressed frustration of the lack of knowledge of hearing loss by other professionals described in the overall themes section. However, this same level of frustration with any issue was not expressed by either Helen or Dan. Helen and Dan were both aware of the needs of children with hearing loss, but as evidenced by analytic notes, their tone was hopeful and expressed a desire to improve the system. Helen and Dan each reported a strong collaborative network in their areas. Dan discussed his EI team and reflected, “We all work as a team. We do assessments together and we come up with a plan for the family.” He also discussed building relationships with the families and daycare providers. Helen echoed these feelings by stating, “Sharing is part of the community”, and “I have a PT [physical therapist] at my fingertips. I couldn’t do it alone.” Helen affirmed that it is more of a community versus an independent approach to service delivery. The beliefs of Helen and Dan are in stark contrast to the frustration expressed by Jane.

Interviews were coded for evidence of auditory skill development and caregiver coaching practices. Helen and Dan were each able to discuss easily family-centered practices used in early intervention. This included working with the family to develop plans based on their needs, information sharing, demonstration, modeling, reflection, asking and answering questions, and observation. Helen and Dan also were able to discuss, without prompting, auditory skills including comprehension, identification, discrimination, awareness/detection, and auditory strategies. All of the TDHH reported extensive professional development and coursework. They all discussed the same annual state level training, Opening Doors and Unlocking Potential, sponsored in part by the VCU Training and Technical Assistance Center. When Jane was asked about caregiver coaching practices and auditory skills, she could discuss demonstration, asking and answering questions, and the basic premise of carryover throughout the week. She was not familiar with the family-child performance indicators. Jane did not name any auditory skills that she could target.

In reviewing transcripts to determine what may explain the differences in knowledge between participants interviewed, the educational backgrounds, years of experience, self-reported comfort scores, and experiences were examined. All three professionals were trained at universities with a background in American Sign Language and Deaf culture. Helen did have graduate training in Ling speech development (Ling, 1988) and was trained outside of Virginia. Each professional has been in the field of education for more than 20 years with Dan and Jane having over 30 years each in working with children who have a hearing loss. Dan reported lower comfort scores for auditory skills which is not consistent with the interview findings, although it was not statistically significant. Comfort skills for caregiver coaching were consistent between participants. The only difference in experience appeared to be the number of years working in

early intervention. This appears to contribute to the difference in caregiver coaching as Jane did not have as much hands-on experience with children under the age of three.

The researcher suspected that the differences in underlying knowledge may have been due to personal bias due to one unprompted comment made by Jane during the interview process. She emphatically stated that there were only five teachers in her area of the state that were TDHH and only three of them could sign. Jane continued, “It is a civil right for a Deaf person to choose sign language or speak – it is a civil right to choose your own language.” This statement potentially negates parental choice. The parent has guardianship over their minor child and is responsible for making decisions for their children. If they do not have unbiased information, they may not be making an informed choice of communication for their child. During the member-checking process, themes were reviewed with each of the participants and the discrepancies between interviews were addressed. Dan and Helen each reported that their own philosophical belief was rooted in parental choice. Helen stated, “I give them all the options. But by the time they get to me, they already know what they want to do.” Dan clarified, “I do what they want. If they want sign – they get it. If they want oral – I do that too. Not my kid -not my choice.” When asked about communication options, Jane stated her belief that while parental choice is “nice” she believes all “these children” will need sign and they need to have ASL as a first language. She reported that while she does not have extensive experience in early intervention, the children begin signing when she starts working with them in Kindergarten. She stated, “These children are just so behind and I have to do something to get them caught up.”

***Developmental Specialists.*** Early intervention providers identifying themselves as Developmental Specialists served families in multiple capacities. Warren and Carol, in addition to being Developmental Specialists, are also employed in supervisory positions. Warren and

Helen work exclusively in early intervention while Carol also works in the school divisions.

Themes that emerged from the analysis of interviews indicated that they value their relationships with audiologists and had high comfort levels in coaching.

Diagnostic audiologists are not directly employed as early intervention providers, but are resources within the community. According to a pediatric audiologist in the Richmond area, community pediatric audiologists are obligated to provide information and work in collaboration with early intervention providers and school personnel. This is expected despite not being compensated monetarily for this role or having direct time in their schedules to do so. The audiologist diagnoses hearing loss after a ‘refer’ on the Universal Newborn Hearing Screening and then that information is given to the Virginia Department of Health. When a parent chooses to use amplification for hearing loss, an ongoing relationship with the private audiologist emerges. The families may see the audiologists every few weeks for the first few months of receiving any amplification for a variety of reasons including monitoring the stability of the hearing loss, making new earmolds as the child outgrows them quickly, or working on hearing aid retention. Helen, when asked about what other professionals she collaborated with regularly stated, “Audiology. I’m only as good as the audiologist who helps my client. So, they are number one.” Carol expressed the relationship between her team with the audiologist by stating:

With children with hearing loss we should make sure they are hearing. So, somebody has to be in touch with audiology and ENT Department to make sure that their ears aren’t clogged and that they have up-to-date hearing aids and that they know how to work them.

Warren reported maintaining early contact with the audiologist. This included working with them on hearing aid retention (i.e. making sure they stay on), the child wearing their cochlear implant consistently, and making sure they have appropriate auditory access. Warren also has

weekly contact with one of the cochlear implant team audiologists as he provides services to families in early intervention and school-based services. He discussed consulting with the audiologist on progress once a child has a cochlear implant or assisting children in obtaining hearing aids or FM systems. Overall, the Developmental Specialists used their relationship with the audiologist as an opportunity to not only assist individual families, but to learn about recent technology.

Each of the Developmental Specialists interviews showed elevated levels of knowledge of caregiver coaching. This included directly stating multiple family-centered practices. This knowledge extended to a focus on speech and language development for children with hearing loss. Carol illustrated her practices:

We have an ISP but when you get down to specifics: What kind of words do you want to pass to Shane? Do you want him to say please, do you want him to say help, to say bye-bye, cup, what kind of words will work in your family? I help them specifically decide what they want to happen. Then we teach how it works. I also use a technique of having the parent show me how it goes. Put her in her high chair and let me see how you do it, how it works. What questions are you having, what's working for you, what's not working for you, the cue with the parent is helping them move forward.

Carol serves in a supervisory position in addition to providing direct services and has seen the model of early intervention change from direct one-on-one services with the child to providing family-centered practices within the natural environment using coaching. She described how to share information with parents with this model and some basic steps to target gaining auditory attention. She reported:

You can't choose the option of what will make them comfortable, but you can give them information. You can say studies have shown that background TV can diminish language. So, what do you think about that? So, I can still give them information.

Carol continued describing isolating auditory skills when providing coaching as:

Are they making sure that they are not gesturing. They [the parent] will say my child understands and then you watch them and say, oh wait, they're pointing. Every time you say get the ball they [the parents] are pointing at the ball. And the child gets it, OK, does the child you know, understand the words. I think for the parent to be aware of some of those behaviors that are going to help the child to actually advance their listening skills. It's one thing for the parent to tell you, it's another thing to watch how it happens. Sometimes you don't even realize you're gesturing.

Carol, Warren, and Helen each have extensive professional development experiences. Carol took online coursework when a child on her caseload received bilateral cochlear implants at approximately nine months of age. She stated that taking online coursework and speaking with the cochlear implant team assisted her in being more comfortable to provide services. Despite her extensive knowledge in caregiver coaching evident in the quantitative surveys and in the qualitative interviews, she reported low levels of comfort with providing auditory-based services for children with hearing loss. She said, "I am not comfortable. I would just be assisting someone who is doing that kind of therapy."

Warren and Helen both are very comfortable providing auditory-based services and have extensive knowledge of caregiver coaching. They each described sessions in the home focused on developing auditory skills with the parent actively engaged. Warren illustrated this:

We talk about using different strategies for drawing attention to specific sounds or words. Early on we might use a learning to listen sound, give them toys to represent a certain sound we're trying to focus on; repetitive use of that toy and that sound to get the child to start repeating that sound. We use highlighting, we talk about parallel talk, usually that's the early intervention stages. Maybe what language goal we are focusing on, whether it's a certain preposition or putting 2 or 3 words together, or using attributes. Helen described a similar scenario in a session with the use of literature. She discussed using a book in the home and modeled for a parent how to read the book and use it as a tool for development by picking out the sound or words that they are targeting for the child. Then, she would pass the book to the parent and have them do the same with support as she coached them through. Helen stated she sees even the "shyest mom" begin to use the techniques and become comfortable with the strategies. As a group, Developmental Specialists appeared very comfortable discussing coaching. They described in-depth how to coach parents and meet the needs of the family.

**Overall themes related to family-child outcome requirements.** Interviews revealed barriers and supports to meeting the family-child outcome requirements mandated by IDEA. There were three distinct themes present with regards to the early intervention system including: (a) viewing services for children with hearing loss as different than other disabilities; (b) concern for families and the system of supports in Virginia; and (c) intensive continued professional development. Finally, participants had suggestions for improving the EI system in Virginia and improving services for children with hearing loss through professional development.

***Different service delivery.*** Participants viewed the services for children with hearing loss as different than other developmental services. They expressed that the content is different even

though LSL intervention follows normal development of speech and language. The ‘what’ may be the same, but the ‘how’ is in stark contrast because speech and language are being developed through audition. Judy summarized the differences:

I think that is a little more difficult than just coaching the normal development of use of language because there are so many more things that go into that kind of therapy. I would say that is a lot more difficult with a child with a hearing loss...It’s really difficult because auditory verbal therapy teaches one thing and coaching teaches something completely different and you have to find, do I do one or do I do the other?

Carol also believed that the children with cochlear implants required intervention and services that are different than what is traditionally provided by SLPs or Developmental Specialists. She said:

With a child with cochlear I realize there’s another full layer of how close they need to be to actually hear, the fact that they shouldn’t use cues from the mouth because they need to learn to listen and not watch so much and not gesture at all. So, it’s very different.

Carol also discussed the beginning caregiver coaching that is unique to this population such as making sure the parent is aware of distance. They need to be taught specific skills and the importance of being close to the microphone on the cochlear implant. Carol also discussed being responsive to the child’s communicative attempts:

They need to think about ways for the child to understand what they are saying and another thing is the child was telling us a lot of stuff but wasn’t really answering our questions. So that’s a skill as well, to listen to the question and answer it. She was telling us everything she knew about her baby doll but when Mom asked her something, she just went on and on about the baby doll. Like she disregarded the question. So, in that case I

just threw it back to the speech therapist. OK, is she actually hearing the question, is it a skill she hasn't learned yet.

The unique characteristics of children that have a hearing loss was also on Doreen's mind as she discussed how to provide strong services using a coaching model. Traditional LSL therapy are provided in clinics by professionals with the LSL certification due to the lack of early intervention providers providing these services in the natural environment. This model uses a less natural setting and the therapist has a written plan for the session with materials in the office. Given the specialized training of the LSL professional, the focus is on auditory skills and coaching. However, the coaching in an office setting is in stark contrast to the coaching provided in the home. Doreen continued:

It is a very awkward situation because these kids are different. It is not like the child is developmentally delayed and we are not sure what is going on with them. We know exactly what is going on with them. And we know exactly what they need but our hands are tied going in there [the home].

Doreen referenced the EI model and reported feeling stifled to provide the services in the manner that she believed was needed for this disability area. She continued, "It is like no matter what mode of communication they are using, they all need very specific things." However, she noted that for children where there are no additional disabilities, "they have a sensory issue, we know exactly what we need to do to get them there" about the child being Kindergarten ready.

Helen viewed the differences in service delivery similarly to Doreen. She viewed the therapy she provides in the home as essential to the audiological services.

Highly developed communication through audition only and we have lots of activities and tools from the very beginning on listening and how he responds to sounds. The child

is able to get their audiological booth testing done and they know what to do with the Ling sounds, how to turn or put a block on the board so we can find tune those settings even better. I do not provide visual prompts, so I have the mom seated next to a child. I will obscure my mouth so they can't read my lips and we start off with a very quiet environment so we can do optimal listening in the environment so the child can get used to what he needs to know that comes through his ears and not his eyes.

While the participants viewed the services for children with hearing loss as different from other more traditional models of development, they also discussed their concerns for families in Virginia.

***Concern for families and system of supports.*** First, participants, regardless of years of experience or professional designation, expressed concern regarding services for this population within the educational system. They expressed an understanding of the time-sensitive nature of working with children who have a hearing loss and the consequences of no early intervention.

For example, Doreen stated:

We kept seeing kids that were walking in the door at age 4 without hearing aids and I am like - what you know - this is crazy. And I say where have you been? And the parents look and mom is like "I was busy." But it was frustrating and I thought well maybe having someone in the early intervention side would help. Although being in early intervention now I see it is a whole different set of challenges and the mindset that frustrates me at times.

Helen felt these same sentiments and it prompted her to make the switch from providing school-based services to working within the EI system.

At the time they were coming in they were being implanted and then everything stopped. Then the parent wanted them to talk but there was nothing unless you got lucky enough to get into EI or got a speech therapist. So, there wasn't anybody with hearing impaired background to manage your audiological, to make sure you were getting audiological needs met to learn language. So, I decided then to work in EI, that's why I added EI, because I thought I'm in a pre-school and it's not young enough so I decided to go younger.

Concerns expressed within the early intervention system included not being allowed enough time to work with the families. Doreen described being allotted one 30-to-45-minute session every two weeks for each family on her caseload and being told that she could not deviate from that unless there was strong justification. She stated that families must advocate for more time on their Individualized Family Services Plan (IFSP) for her to get permission to stay with the family for the hour or more per week she believed that these children needed to make substantial language progress. Regardless of the time allotted on the IFSP, she stated she spent more than an hour with the families each week and made more frequent visits when needed. Through all the interviews, the providers all appeared to be going above and beyond their expected job responsibilities to meet the needs of the families and the children.

Additionally, participants identified that EI services are crucial for children with hearing loss, but services may not be available in their geographic area. Dan illustrated the lack of providers:

I think that is my big concern - that in my county they have someone with a background in deaf education and I think we are not the norm across the state obviously. There are

many places where they barely have a speech therapist - let alone a teacher of the deaf involved in the program.

This dilemma led to the conclusion by Doreen that the EI model may not meet the needs of all families, but not all families have access to other services. She expressed frustration in the rigidity of the EI system when the families may be best served by either providing them transportation to reach essential services not available due to lack of providers. She felt that the families should have flexibility to obtain services in the clinic simply because that may be easier for individual families. Helen said something similar.

If I don't feel like I'm getting where I need to be, I will hook up the families with [cochlear implant team therapist] just like she will sometimes add in me. Sometimes it's the home, sometimes the home setting is not an appeal. I'm not here to judge, but sometimes it's just not going to work in the home. When we're not making the progress and we need to try something different. I know when to make a change. And I think that is really important.

Helen stated that it may not be popular, but she makes it a priority to let parents know that her services are not, "the only game in town" and families can choose the best option for them. However, she noted that her economically disadvantaged families may not have as many options in that not all outside providers will accept Medicaid.

Adding to their concerns, the participants discussed the lack of knowledge regarding hearing loss by the public-at-large as well as other professionals. Jane discussed being in Individualized Education Plan (IEP) meetings and stating:

I still think that every profession that comes to that table thinks their profession is much more important than the hearing. I get furious because everyone just dismisses the sense

of hearing. I try to talk to them and educate them, but you are constantly educating them - the public at large.

She continued to talk about these meetings:

I really don't see how it is taken seriously. The parents. Now the parents are good. They know and they are right into me and they are asking me questions. It is society at large. They just dismiss hearing.

Doreen also acknowledged the lack of education for the public-at-large, but looked to change the system and increase understanding thereby improving resources. She suggested improving relationships with pediatricians. She stated:

Talking to pediatricians –if a child failed the universal newborn hearing screening – flag that file. That pediatrician should be asking that parent every time they come in and even following up with phone calls – have you had that appointment? Have you followed-up? Because I don't think they sometimes truly understand the magnitude of what this means. One of my dads is a family doctor and he says he wants to have us talk to pediatricians and talk to them about the importance of early intervention and keeping on those families that the child that failed that screening. Of course, some of those may be the families that are jumping clinic to clinic and not being seen by the same person.

Despite the many challenges to working with this population in the early intervention system, and having concerns regarding how to improve service delivery, each of the providers used professional development as a connection to alleviate their concerns and make them feel empowered.

***Professional development.*** Participants indicated that they desire to work with families and children with hearing loss exclusively due to the extra expenses they had to incur to obtain

training, but are not capable of doing so. Three of the participants provided services to children with hearing loss, exclusively. For many of the participants, their job responsibilities are split between children with varying developmental delays, part-time and full-time job responsibilities, or providing services in both the Part B and Part C systems of IDEA. Professional development opportunities that participants indicated they utilized are indicated in Table 24 with common costs associated with each program. Each participant, when asked what professional development opportunities they found to be most beneficial, indicated they attended any or all opportunities when offered around the state. This included the Opening Doors Unlocking Potential conference.

The participants were split on who paid for the additional coursework. The Smart Ears program as well as the conferences or presentations were paid for by the employer. However, the participants themselves paid for college-level courses and the Carolina Summer Institute, with grant assistance at times. Dan justified the cost by saying, “At the time I had 15 years left on my career, so why not?” about the Carolina Summer Institute.

During the interviews, several participants referred to mentorship experiences and on-the-job training as opportunities that assisted with their own learning as the most beneficial for them. The Carolina Summer Institute combines hands-on learning opportunities with coursework. Dan referred to the intensive two-week program as:

Week one was the fire hose approach in the classroom where they just bombarded us with information and week two we actually worked with children applying the techniques.

Three participants discussed the children that they see for services also receiving services through the cochlear implant teams. The professionals regarded the relationships with these

programs to grow in their skills and to have a professional that is a Certified Listening and Spoken Language Specialist assist them with difficult cases.

Table 24

*Professional Development Examples from Participants with Associated Costs*

Name of Program	N	Associated Registration Cost
ASHA conference	1	\$390 - \$795
Smart Ears (online courses)	2	\$89 - \$740
Carolina Summer Institute	2	\$100 (NC Residents) \$1200 (out-of-state)
AG Bell national conference	2	\$499 - \$599
Kathryn Wilson/Warren Estabrooks Presentations	2	\$100 - \$450
Courses at Radford University	3	\$450 - \$1500
Opening Doors Unlocking Potential (Virginia)	6	Free - \$120

*Note: ASHA --American Speech-Language Hearing Association; AG Bell --Alexander Graham Bell Association for the Deaf/Hard-of-Hearing*

**Participant recommendations for improvements in service delivery.** Participants were genuinely concerned about not only their individual students' progress, but also in discovering ways to improve the early intervention system in Virginia. They provided concrete suggestions for professional development opportunities. Dan suggested developing a mechanism to link new professionals or professionals without experience working with children who have a hearing loss with those who have not only content-specific knowledge, but extensive experience in early intervention. This would be a model like the one described by the SLPs, but more formal in

nature. Dan also discussed learning modules for working with children who have a hearing loss previously offered in Virginia.

I've taken those modules, in fact I think I helped make some of those modules, but my big thing is that it's an awful lot of information for people to grasp and understand, especially if they don't have a true interest in it. If someone is interested in it, I think you have a better chance of them following thru and having contact. I think it would be important to have people who would almost act as mentors to guide people. Because a lot of time service providers will come across kids who have a hearing loss and it's the first time they have ever come across a kid with a hearing loss and they don't understand the whole process and that it's not just a matter of slapping on some amplification and you're good to go. There is a lot of work that needs to be done, especially in the early years. They need to have training, but there needs to be some kind of partnership with someone who could guide them in the process and say, "hey, contact this person and they can help you figure out what you need to do given that you don't have extensive background in this area."

Furthermore, Doreen discussed the disconnect between the early intervention providers and the speech-language pathologists in the school divisions. She is very cognizant of the transition of Part C to Part B services of IDEA as she works within both of the systems. She suggested:

As we are implanting kids younger, you are having more and more of those kids in their home schools and I wonder if one session or even some regional programs and trainings maybe during the school year – southwest Virginia, northern Virginia, and in the Tidewater area – for speech-pathologists working with kids in with hearing loss in their home schools –that might be a great thing. You could include the EI people and the

school-age SLPs together. Speech people have a great background – they have the speech acoustics, they have the language development. They may have to peel it back to bring it forward. But, it is like you know what - they have the strategies and the why - it is just getting them the how and how to get there.

Participants also want to have research-based professional development. Helen talked about the difficulties of not working directly with audiologists who have access to the newest technologies. Information on the newest technologies is necessary for providing caregiver coaching and information sharing to the families. Helen stated:

Professionally anything attached to the most up to date technology in audiology because I'm not in an audiology center I can't keep up. A parent could ask me a question and I could re-direct back to the audiologist and I would like to have a general response. So sometimes I'm like, I don't know that because I'm not there and I don't get to see the latest and greatest all the time. I try to look stuff up, I try to stay on it but it is a sea of information. What my families might benefit from or what they might ask me about I need to have an understanding of. Every time I think I am caught up somebody mentions something else.

Warren in addition to being a Developmental Specialist is also a supervisor for providers working in the public-school system and Part B of IDEA. He discussed the training needed for professionals in Virginia in her experiences as the medical field has made significant advancements over the past 20 – 30 years.

I would like professionals to be more aware of what cochlear implants and hearing aids with appropriate auditory access early can do for an individual. I think the majority of teachers for the deaf and hard of hearing in the field are older and they haven't

experienced appropriate auditory access and development of speech and language and they really don't have the grasp about how technology has changed in our field.

When asked how this can be accomplished, Warren responded:

It's probably going to have to come from workshops. The courses are considered extensive and time consuming and the best way to reach out to people is in short workshops that can increase their knowledge and give them hands on things that they can take back and use readily in their field.

All the TDHH had extensive experience in the field of education, but their experiences overall were primarily through Part B services. Their knowledge of technology varied greatly and supported Warren's beliefs. For example, Dan and Helen had extensive experience and both felt comfortable with technology as they also have developed strong relationships with the cochlear implant teams near them geographically and local audiologists. However, Jane reported that she has attended many workshops throughout the state, but lacked an understanding of the maximized benefits of cochlear implants and advanced technologies. This was evident when discussing how to use caregiver coaching practices and auditory skill development within the EI system.

First you need to help them understand about hearing loss. Children if they can't hear it and they miss it. If they do or don't have the technology you explain to them that their level of conversation is slowed up – halted sometimes. There are simple rules. You look at them face-to-face. You try to get good eye contact. You explain to them about staying away from bright lights and explain to them that not everyone is going to be a speech reader. It is not something everyone can learn and depending on their level of hearing loss it dictates to them what I say.

Furthermore, participants recognized the need for specialized training to assist providers in developing a deeper and more meaningful understanding of how to develop auditory skills and how to do so within the EI model. Doreen felt that even with her extensive experience, strong relationship with the cochlear implant team, and her previous professional development, she needed to have more of the basics of LSL. She said, “I think some of those very much introduction to listening – like going through the auditory learning guide and going through each of those sections and why they are important and how you do it.” She continued to discuss how auditory strategies are valuable for her as well as SLPs in the school divisions. She stated that the SLPs, “understand the language but not always how we are accessing it differently and the importance of that.”

Warren suggested a very specific training program for professionals across the state. The Cottage Acquisition Scales for Listening, Language, and Speech (CASLLS) is a set of multiple checklists for development developed at the Sunshine Cottage School for Deaf Children in Texas. Warren wanted more training across the state on completing language samples in conjunction with the CASLLS checklists and using it as an assessment and tracking tool. Warren continued to describe the CASLLS:

It looks more to the grammatical structures that a child might be using. I’m thinking of children that are still demonstrating significant language deficit even though they may be speaking in longer sentences. Everyone considers early intervention, but taking a look at grammatical structure and deviation of grammatical structure students might be using and implementing strategies for them and their parents.

Warren also wanted trainings to be continual with follow-up contact available. He expressed that courses through a university are considered expensive and time-consuming, but the best way to

get the information to professionals is through short workshops. He suggested, “give them hands on things that they can take back and use readily in their field.”

### **Document Analysis**

Documents for certification and licensure for each of the participant groups were analyzed using codes developed from participant interviews and then the professional requirements were compared to each other. Document analysis is a three-step iterative process consisting of: (a) superficial examination; (b) thorough examination; and (c) thematic analysis (Bowen, 2009). Each of the documents and their target audience are described followed by themes present between them. The documents analyzed consisted of the minimum certification or licensure requirements published by the three national organizations that oversee the interview participant groups as well as the early intervention endorsement competencies for Virginia.

These included the following:

- (a) Council for Exceptional Children (CEC, 2015): *Initial Specialty Set: Deaf and Hard of Hearing*. CEC Specialty Set
- (b) Council for Clinical Certification in Audiology and Speech-Language Pathology of the American Speech-Language-Hearing Association (ASHA; 2013): *2014 Standards for the Certificate of Clinical Competence in Speech-Language Pathology*. ASHA Competencies.
- (c) AG Bell Academy for Listening and Spoken Language (AG Bell Academy; 2007): *Core Competencies/Content Areas/Test Domains for the LSLS*. AG Bell Competencies.
- (d) Virginia Department of Education (VA DOE, 2007) *Program Status Matrix: 2007 Special Education Early Childhood (Birth – age 5)* 8 VAC 20-542-450 VA DOE Matrix.

**Thematic analysis of documents.** Thematic analysis consisted of coding each of the documents using the a priori codes developed from the literature previously used for coding of the interviews combined with codes developed from the participant interviews (Appendix F).

The CEC *Initial Specialty Set: Deaf and Hard of Hearing* (CEC, 2015) delineates essential knowledge and skills for beginning special education teachers who work directly with children who have a hearing loss. This is applicable to the early intervention providers designated as Teachers for the Deaf/Hard-of-Hearing. The *2014 Standards for the Certificate of Clinical Competence in Speech-Language Pathology* (ASHA, 2013) defines the minimum national academic and professional standards to become a certified Speech-Language Pathologist. The AG Bell *Listening and Spoken Language Specialist (LSLS) Core Competencies* states the basic knowledge requirements for professionals to qualify for testing to obtain the LSLS Certification (AG Bell Academy, 2007). This certification was held by two of the participants in the quantitative phase and one of the participants in the qualitative phase of the study. The VA DOE *Program Status Matrix: 2007 Special Education Early Childhood (Birth – age 5)* is the guiding document for universities to incorporate core competencies to prepare students to become Developmental Specialists and these identified competencies were used in the development of the online training modules required for all Virginia EI providers. Each of the four documents can be classified as regulatory within their respective organizations.

Themes present through the document analysis consisted of differences in the following: (a) collaboration; (b) coaching; and (c) required auditory skill knowledge. Each document discussed collaboration with other professionals. Table 25 displays the collaborative professionals indicated in each of the documents included in the analysis. The VA DOE Matrix

emphasized a collaborative model working with other professionals while the other documents refer to collaboration with other professionals briefly.

Table 25

*Collaborative Professionals Contained in Certification Documents*

Collaborative Professionals	ASHA	CEC	VA DOE	AG Bell
School Professionals		✓	✓	✓
Related Service Providers			✓	
Paraprofessionals			✓	
Health Care Professionals			✓	
Organizations		✓	✓	
“Other Professionals”	✓			

*Note: ASHA --American Speech-Language Hearing Association; CEC -- Council for Exceptional Children; VA DOE -- Virginia Department of Education; AG Bell -- AG Bell Academy for Listening and Spoken Language.*

When the concept of collaboration is applied to parents, only the AG Bell LSL core competencies specifically used the term “coaching.” AG Bell defined coaching in terms of family counseling, coaching, and guidance including the following specific terms: active listening, reflective listening, questioning, open ended statements, modeling, demonstration, providing feedback, and adult learning styles (AG Bell Academy, 2007). The ASHA Competencies (ASHA, 2013) discussed counseling of patients, families, and caregivers regarding communication disorders. Further explanation of what this means is not provided within the standards. The CEC Initial Specialty Set (CEC, 2015) stated within Standard Seven that teachers will, “provide families with support to make informed decisions regarding communication modes, philosophies, and educational options.” The VDOE Matrix (VA DOE, 2007) references consultation, case management, and collaboration in working with children and families. In addition to listing the competencies, the VDOE Matrix (VA DOE, 2007) lists resources available from the state in each area and those resources address coaching specifically.

Finally, there were differences in the requirements for knowledge of auditory skills reflected in each of the documents. CEC Initial Specialty Set (2007) required knowledge of the effects of sensory input on the development of language and learning. However, auditory skill development was not directly discussed. Similarly, the ASHA competency standards required professionals to have taken courses including the impact of hearing loss on speech-language development, but there is no direct ASHA requirement to have knowledge of auditory skill development. While the VA DOE Matrix discussed overall development, it did not discuss auditory skill development. The only regulatory document to discuss auditory skill development was the AG Bell LSLS competency. Domain two addressed Auditory Functioning with the first subheading listed as “auditory skill development” followed by “infant auditory development.” Domain Six addressed the auditory strategies for listening and spoken language development including language facilitation techniques and acoustic highlighting.

**Content comparison.** Content analysis was completed to determine what similarities and differences in core competencies exist when working children with hearing loss according to the regulatory agency documents. Content analysis organizes information into categories related to the research question (Bowen, 2009). The requirements from each organization were compared to each other as well as to participant responses from the surveys and interviews (Biklen & Bogdan, 2007). The data from the document analysis was used as a comparison to the lived experiences of the participants. The four documents were examined for evidence of caregiver coaching, early intervention, and development of speech, language, or auditory skills. This knowledge assisted in answering the mixed methods research question when combined with interview data and quantitative results. Table 26 displays the findings from the content analysis divided by category. The results show that only three competency areas cut across all four

regulatory documents: language development, collaboration with other professionals, and assessment indicating that the regulatory documents have not been brought up-to-date with current research findings.

Table 26

*Content Analysis of Regulatory Documents*

Competency Area	AG Bell	CEC	VA DOE	ASHA
<b>Caregiver Coaching</b>				
Collaboration with Parents	✓			✓
Parent Guidance, Education, and Support	✓			
Support for families in making communication choices		✓		
Coaching	✓			
Adult Learning Styles	✓			
<b>Early Intervention</b>				
Early Intervention	✓	✓	✓	
<b>Auditory Skills</b>				
Auditory Skill Development	✓			
Auditory Strategies	✓			
<b>Speech (Articulation)</b>				
Speech Development	✓		✓	✓
Strategies for Development Through Audition	✓			
<b>Language</b>				
Spoken Language Communication	✓			
Sign Language Communication		✓	✓	
Language Development	✓	✓	✓	✓
Language facilitation	✓	✓		✓
Dual language acquisition		✓		
<b>Other</b>				
Hearing and Hearing Technology	✓			✓
Assistive Technology	✓	✓		
Audiology	✓			✓
Medical Aspects			✓	✓
Hearing/Speech Science	✓			✓
Cognitive Development	✓		✓	✓
Gross and Fine Motor	✓		✓	
Play	✓		✓	
Hearing loss and effect on communication	✓	✓		✓
Communication Modalities (linguistic and nonlinguistic)		✓		✓
Collaboration with other professionals	✓	✓	✓	✓
Ethics		✓	✓	✓
Professional Issues	✓	✓		✓

Assessment	✓	✓	✓	✓
Professional Development	✓	✓		✓
Legal/Policy			✓	✓
Evidence Based Practices	✓		✓	✓

*Note: ASHA -- American Speech-Language Hearing Association; CEC -- Council for Exceptional Children; VA DOE -- Virginia Department of Education; AG Bell -- AG Bell Academy for Listening and Spoken Language.*

### **Summary of Qualitative Phase Results**

Nine early intervention providers participated in semi-structured interviews during the qualitative phase of research. These professionals represented Speech-Language Pathologists, Teachers for the Deaf/Hard-of-Hearing, and Developmental Specialists providing services to children with hearing loss in Virginia. Coding from a set of predetermined a priori codes, open coding, and In Vivo coding were used to determine themes present within each group of professionals and across all participant groups. Speech-Language Pathologists spoke about their graduate programs being inadequate in preparing them for working with children with hearing loss and for working in the EI system using caregiver coaching. Teacher for the Deaf/Hard-of-Hearing showed disparity between their viewpoints potentially influenced by communication bias. Developmental Specialists viewed audiologists as essential partners in providing strong services as well as demonstrating high-levels of understanding with the coaching model.

Overall, the participants viewed services for children with hearing loss as being different than other developmental services provided in EI. These concerns were expressed during not only their descriptions of coaching, but also when discussing how to meet the family-child outcomes requirements. The participants have concern for families and the system of supports available in Virginia and identified obstacles to progress. Additionally, the participants all participated in intensive continued professional development opportunities. Programs ranged in price from free to \$1500 with the most cost prohibitive programs being an out-of-pocket expense

for the professionals themselves. Employers only paid for the local conferences and state-level trainings. The participants also provided suggestions for improved service delivery for children with hearing loss and their families in Virginia. These included mentorships for professionals, regionalized programs, CASSLS trainings, and workshops for the EI providers and the school-based SLPs together.

The document analysis showed differences between regulatory documents in the collaboration expectation with other professionals. There was only one document that specifically addressed auditory skill development. Also, the standards for each used a different term such as coaching, consultation, or counseling in working with families. Content analysis showed the similarities and differences between the regulatory agencies core competencies and was used as a part of the mixed method analysis.

### **Mixed Method Analysis**

The mixing of data following the quantitative and qualitative phases allowed for a deeper understanding of caregiver coaching and auditory skill development in early intervention for children with hearing loss. The mixed methods questions ask ‘In what ways do the experiences and perceptions of EI providers explain their perceptions of caregiver coaching and auditory skills development?’ and ‘How do the ASHA, CEC, and AG Bell standards influence any differences between the beliefs of EI providers regarding caregiver coaching and auditory skill development?’

### **Groupings and Qualitative Data**

First, data from the quantitative phase was compared to participant responses from the surveys and interviews. These data answered the mixed methods research question ‘How do the ASHA, CEC, and AG Bell standards influence any differences between knowledge and caregiver

coaching of varied service providers?’ Qualitative themes from participants are displayed jointly with quantitative groupings (*Figure 6*). The quantitative and qualitative results are linked to further explain the similarities and differences between Teachers for the Deaf/Hard-of-Hearing (TDHH), Speech-Language Pathologists (SLP), and Developmental Specialists educational backgrounds and their views of caregiver coaching regarding auditory skill development.

**Speech-Language Pathologists.** SLPs perceived that their graduate training did not prepare them to work with children with hearing loss using Listening and Spoken Language (LSL) in early intervention, consistent with the document analysis as they did not have specific coursework in caregiver coaching or auditory skill development. Survey results indicated there was not a significant correlation between the larger construct of auditory skill development and caregiver coaching for SLPs. However, caregiver coaching strategies were positively correlated with auditory identification and auditory comprehension. Given that in the interviews, SLPs valued mentorship experiences which are also part of their Clinical Fellowship Year (CFY), they are obtaining their knowledge of coaching and auditory skills development out of necessity to provide strong services for this population. Judy expressed how she developed her coaching skills during her CFY:

For me I think it kind of came naturally. We’re trained that after a session we might talk to the family about how the session went, and how they can work on the session at home. We’re given a little bit of training for that but I think mine came more naturally. I like people, I’m a people person, I’m good at listening. A lot of parents just need you to listen and then a problem solved with them on how to work on things so I don’t think it was necessarily my education that prepared me, I think it was just life in general.

Judy continued that if she had not taken a position in the EI system, she would not know anything about coaching. She stated, “Sometimes I still have no idea how to help them. I have to consult with (supervisor’s name) and she guides me on what to do. But, she’s not an SLP either.” Judy’s experiences show that she obtained her knowledge of coaching from job embedded coaching by someone outside of her field of study as her supervisor is a Developmental Specialist. As referenced earlier, she received her knowledge of auditory skill development from intensive online coursework and consultation with the cochlear implant team therapist.

Job embedded coaching experienced by Judy is similar to Todd’s experiences. Both young therapists gained the information they needed to work with young children with hearing loss by working closely with Developmental Specialists, intensive professional development, and reaching out to the cochlear implant teams rather than gaining this knowledge during their two and a half years of graduate training. The ASHA competencies (2013) do not address caregiver coaching or auditory development specifically for SLPs as evidenced by the document analysis. The lack of graduate instruction and exposure during graduate school courses could have explained the high value placed on their mentorship experiences. However, interviews also indicated that the majority of SLPs have not had the opportunity to work with primarily one disability category. They are responsible for providing services to a variety of disability areas with a wide range of severity.

**Teachers for the Deaf/Hard-of-Hearing.** Interviews with TDHH showed a disparity in their viewpoints and their knowledge of auditory skill development and coaching. Similar to the ASHA competencies, the CEC competencies (2015) did not address auditory skills. Surveys revealed a significant correlation between the larger constructs of auditory skill development and caregiver coaching ( $r_s = 0.803, n = 9, p < .05$ ) for this group. The TDHH relied on intensive

professional development as evidenced in interviews. However, the TDHH was the only group that was able to focus on professional development, assessment, and intervention within one primary disability area. The reliance on professional development to obtain the skills necessary for assessment and intervention could contribute to the differences in viewpoints expressed during the interviews. The CEC (2015) competencies was the only document that addressed communication options for children with hearing loss where the other documents addressed overall language development. Experience with children using a variety of communication methodologies and languages (i.e. ASL and English) could also contribute to the bias expressed by one of the interview participants. Taken together, professional development and professional experiences contribute to the biases that existed for professionals trained prior to the successful language outcomes obtained by children benefiting from the JCIH 1-3-6 model.

**Developmental Specialists.** Developmental Specialists viewed audiologists as partners. The core competencies from the VA DOE (2007) support collaboration. Survey data indicated that they did not have coursework in their graduate preparation programs in audiology, aural habilitation, auditory skill development, cochlear implants, or FM systems and can explain their value of this collaboration. While Developmental Specialists interviews revealed advanced levels of caregiver coaching, their comfort with auditory skill development was a standard deviation below that of TDHH. However, Warren was the only Developmental Specialists to report the TDHH as being part of their collaborative team which may be due to him serving in a supervisory role. In contrast, TDHH and SLPs interviewed each referred to the Developmental Specialist as being an integral part of their collaboration.

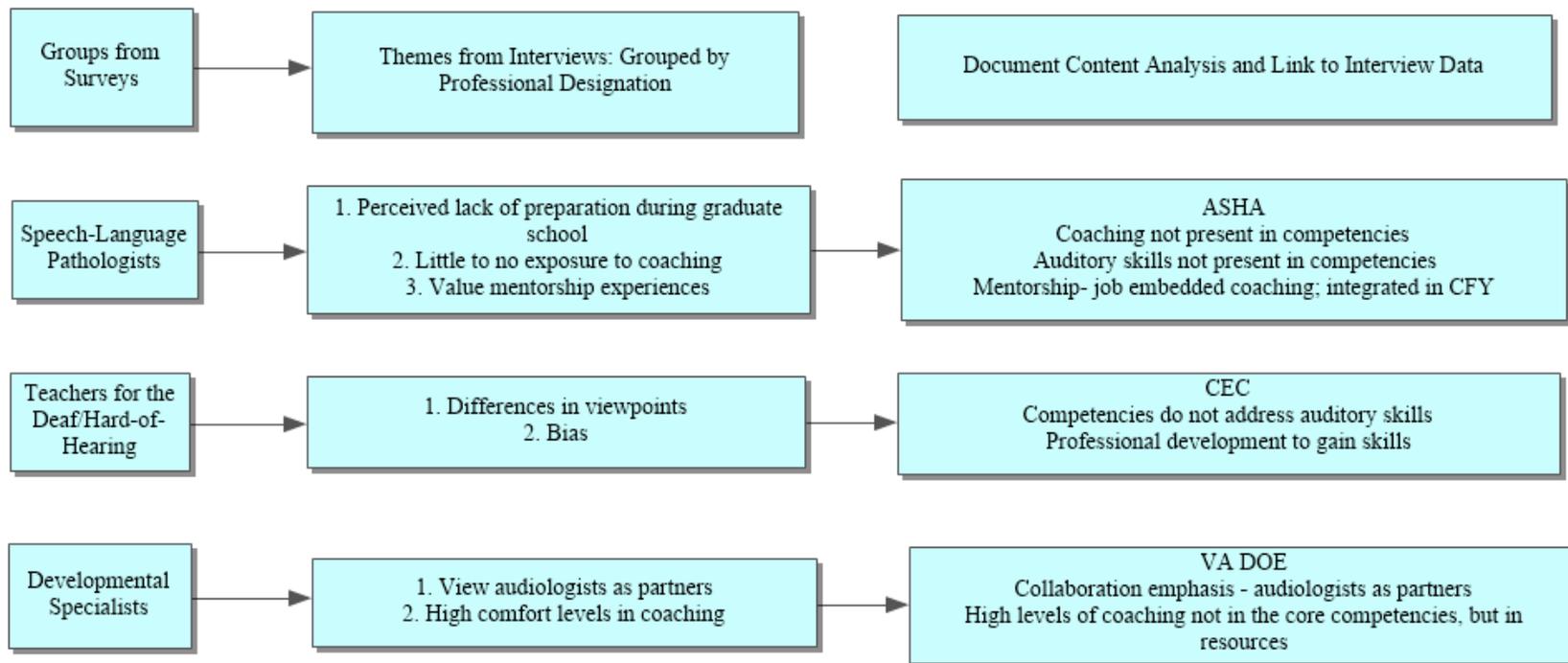


Figure 6. Mixed method display of quantitative and qualitative results with professional standards

**Group.** Additional review of the qualitative results showed that for the entire group of participants there was not a significant correlation for the entire group between auditory skill development and caregiver coaching ( $r_s = 0.254, n = 63, p < .05$ ). Interviews also showed that participants viewed the intervention for this population as different than other disability areas. Table 14 indicates desired continued professional development. Participants desired professional development in Auditory Strategies (90.8%), Aural Habilitation (83.3%), and Auditory Skill Development (81.5%). These areas are: (a) the cornerstone of intervention with children using Listening and Spoken Language; (b) not contained in three of the competency documents; and (c) areas of perceived lack of knowledge documented in interviews.

### **Systems Change**

Data from the interviews and document analysis were compared to systems change theory as proposed by Ambrose (1987) to generate where training needs exist and generate future directions for training using the Train-the-Trainer model. Using multiple sources of data including interviews and document analysis add clarity to the information provided from the initial quantitative surveys. Figure 7 displays the Ambrose (1987) model with future training needs as evidenced by the quantitative and qualitative data.

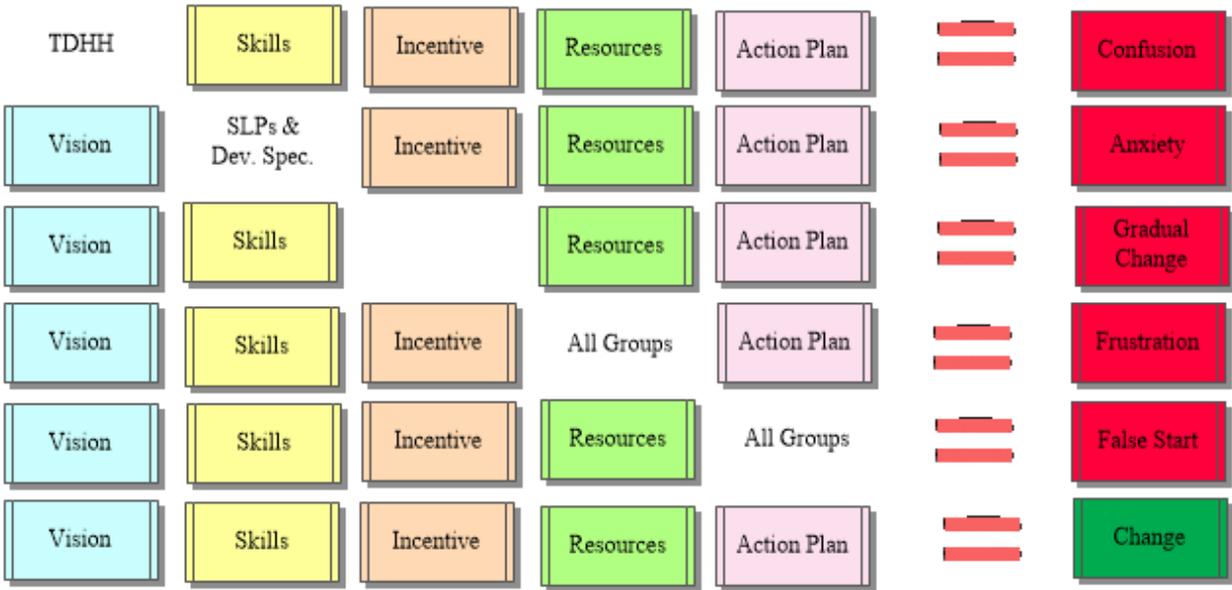


Figure 7. Ambrose model (1987) and future professional development

As a group, Teachers for the Deaf/Hard-of-Hearing expressed varying viewpoints regarding service delivery for children with hearing loss using an auditory skills approach. This discrepancy is translated as a problem in a shared vision resulting in confusion. SLPs revealed a perceived lack of preparation for working in early intervention regarding knowledge of auditory skills development and the caregiver coaching model. According to the Ambrose model (1987) the result is anxiety. The interviews supported this conclusion with the participants discussing not being prepared to fulfill their job responsibilities thus seeking out unofficial mentorships. All groups of participants made recommendations for improvement of service delivery. Their recommendations indicated a lack of resources for professionals as well as for families resulting in frustration. Frustration was evident in interviews regarding specific topics. However, Ambrose's model (1987) also indicates that a lack of an action plan results in false starts. The participants were each asked how to improve the system of services for children with hearing loss. Their responses are consistent with Ambrose (1987) in that there was not a definable action

plan to improve skills, develop or obtain resources, or a vision for what can be accomplished by families and children with hearing loss.

### **Summary of Mixed Method Analysis**

Mixed methods analysis revealed how core competency areas, experiences, and job embedded coaching have influenced the perceived comfort of EI providers in providing services for children with hearing loss. For Speech-Language Pathologists, the core competencies aligned with their perceived lack of training and resulted in job embedded coaching to provide quality services. For TDHH, the lack of auditory skill development and coaching in core competencies resulted in intensive and costly professional development. Developmental Specialists also did not have auditory skill development in their standards, but relied on their collaboration with audiologists.

The mixed methods analysis revealed the complexity of systems change for improving services for children with hearing loss in Virginia. According to the Ambrose model (1987), there is a lack of vision, skills, resources, and action plan from the perspective of the EI providers working in the field. However, the perspectives of the agencies or consumers directly involved with systems change are not part of the current research and must also be considered. Participants made recommendations for improved service delivery resulting from the weaknesses in core competency areas which could potentially impact the areas of need highlighted in the Ambrose model (1987).

### **Summary**

This study used an explanatory sequential design where the quantitative data from the first phase developed groups and informed qualitative data collection measures. The mixed method analysis revealed the complexity of how the experiences and perceptions of EI providers

influence their perceptions of caregiver coaching and auditory skill development as well as how those beliefs are influenced by their respective professional standards. Survey results from 64 early intervention providers in Virginia grouped professionals into three categories of providers: (a) Teacher for the Deaf/Hard-of-Hearing (TDHH); (b) Speech-Language Pathologists (SLP); and (c) Developmental Specialists. The numbers of Developmental Specialists responding to the survey were equal to the numbers of TDHH and SLPs combined. TDHH reported comfort scores for auditory skill development one standard deviation higher than Developmental Specialists despite the CEC core competencies for TDHH do not address auditory skill development. Overall, TDHH showed a significant positive correlation between their comfort with auditory skill development and caregiver coaching. Although not statistically significant, there was an overall negative correlation between the characteristics of caregiver coaching and the constructs identified within auditory skill development for the all survey participants.

Nine early intervention providers participated in semi-structured interviews during the qualitative phase of research. Three SLPs, three TDHH, and three Developmental Specialists represented the three groups of professionals providing services to children with hearing loss in Virginia. Coding from a set of predetermined a priori codes, open coding, and In Vivo coding were used to determine themes present within each group of professionals and across all participant groups. SLPs indicated their graduate program coursework and experiences were inadequate in preparing them for working with children with hearing loss and for working in the EI system using caregiver coaching. TDHH showed disparity between their viewpoints potentially influenced by communication bias because of a lack of core competencies for working with children using auditory skill development and their own professional experiences.

Developmental Specialists viewed audiologists as essential in collaboration and they demonstrated high-levels of understanding with the coaching model.

Overall, the entire group of participants viewed services for children with hearing loss as being different than other developmental services provided in EI; and subsequently, the participants all engaged in intensive continued professional development opportunities. The participants also provided suggestions for improved service delivery for children with hearing loss and their families in Virginia. These included mentorships for professionals, regionalized programs, CASSLS trainings, and workshops for the EI providers and the school-based SLPs together.

The document analysis showed differences between regulatory documents in the collaboration expectation with other professionals. The core competencies from AG Bell was the only document that specifically addressed auditory skill development. Also, the standards for each agency used different terms such as coaching, consultation, and counseling in working with families. The mixed method analysis identified the influence of these core competencies on the perceptions of interview participants and identified areas of need according to the Ambrose model of systems change (1987).

## Chapter V

### **Discussion**

The first hospitals in the United States began Universal Newborn Hearing Screening (UNHS) more than 20 years ago. There have been significant changes in early intervention for children with hearing loss as a direct result of UNHS. Children previously not diagnosed with hearing loss until after the timelines for development of first words and spoken communication, were fitted early with amplification and subsequently enrolled in early intervention programs. Coupling early identification with quality early intervention services results in optimal language outcomes for children with hearing loss (Yoshinaga-Itano, 2014).

Children with hearing loss can develop spoken language with early identification, early amplification, and family-centered intervention. JCIH (2013) challenged the field to improve services for children with hearing loss by increasing access for families to qualified providers with advanced skills and knowledge. Caregiver coaching and auditory skill development have been identified as critical areas necessary for the development of oral language in children (JCIH, 2000, 2007; Suskind, 2015; White, 2006; Yoshinaga-Itano, 2003). Early intervention (EI) providers' knowledge and experience in these areas have a direct impact on service delivery which has not been examined from the viewpoint of a professional providing these services; and had not been addressed in the mixed methods research.

The purpose of this research was to examine the relationship between the EI provider's background and their comfort with caregiver coaching and auditory skill development to develop professional development programs for providers that work with children with hearing loss and families who have chosen spoken communication. Additionally, this research can assist in meeting the expectations articulated in the JCIH position statements (2007; 2013) by strengthening the professional development of early intervention providers providing services.

This study used an explanatory sequential design where the quantitative data from the first phase developed groups and informed qualitative data collection measures (Creswell & Plano-Clark, 2011). Researcher-developed survey data from 64 Early Intervention professionals in Virginia were used to identify groups of professionals providing these services and examined their perceived comfort in caregiver coaching and auditory skill development. During the exploratory follow-up, semi-structured interviews and document analysis were used to bring clarity and voice to the quantitative data. Mixed method data analysis integrated data from the quantitative and qualitative phases to examine how EI professionals' experiences and regulatory standards impact their caregiver coaching and knowledge of auditory skill development.

### **Summary of Results**

Specific research questions were explored in two distinct phases. Analysis of the first phase grouped participants into representative categories of the population. The first research questions ask, 'How do participants' educational backgrounds relate to their comfort providing caregiver coaching strategies' and 'How do participants' educational backgrounds relate to their comfort with intervention targeting auditory skill development?' The researcher identified four groups of participants providing services to children with hearing loss in Virginia including: (a) Teachers for the Deaf/Hard-of-Hearing (TDHH); (b) Speech-Language Pathologists (SLPs); (c)

Developmental Specialists; and (d) related service providers. The related service providers were not directly responsible for language intervention and therefore not included in the exploratory follow-up. The quantitative phase revealed gaps in the educational background of participants in both auditory skill development and practicum experiences in EI. The findings from the current research echoed the JCIH (2013) concerns and found that EI professionals in Virginia as a group do not have the advanced knowledge and skills needed to provide high-quality services for children with hearing loss using listening and spoken language (LSL). Thirty-seven percent of respondents did not have confidence that their college experiences prepared them to provide EI services to children with hearing loss. Roughly half (53.7%) of survey participants observed children with hearing loss during their graduate/undergraduate clinics or externships with only 37% of observations being completed in the early intervention system. Developmental Specialists indicated that they did not have coursework in their graduate preparation programs addressing audiology, aural habilitation, auditory skill development, cochlear implants, or FM (frequency modulated) systems. These same professionals were aware of what knowledge they needed to maximize the language of the children they serve. The most desired professional development for the entire group of participants included auditory strategies followed closely by cochlear implant and FM technologies.

Furthermore, Teachers for the Deaf/Hard-of-Hearing (TDHH) reported comfort scores for auditory skill development ( $M = 118.83$ ) one standard deviation ( $SD = 34.28$ ) higher than Developmental Specialists ( $M = 60.71$ ) and related service providers under the category of “other” ( $M = 52.75$ ). Overall, TDHH showed a significant positive correlation between their comfort with auditory skill development and caregiver coaching. Although not statistically significant, there was an overall negative correlation between the characteristics of caregiver

coaching and the constructs identified within auditory skill development for the group as well as EI professionals in the “other” category comprised of related service providers.

The second phase comprised interviews of members of each of the professional designation groups and a document analysis of regulatory core competencies. Nine EI providers participated in semi-structured interviews and represented SLPs, TDHH, and Developmental Specialists providing services to children with hearing loss in Virginia. Coding from a set of predetermined a priori codes, open coding, and In Vivo coding determined the themes within each group of professionals and across all participant groups. SLPs emphatically reported their graduate programs as being inadequate in preparing them for working with children with hearing loss and for working in the EI system using caregiver coaching. TDHH showed differences between their viewpoints potentially influenced by communication bias. Developmental Specialists viewed audiologists as essential partners in providing strong services as well as demonstrating high-levels of understanding with the coaching model. Overall, there were three themes present in the interviews irrespective of professional background. Participants: (a) viewed services for children with hearing loss as being different than other developmental services; (b) have concern for families and the system of supports available in Virginia and identified obstacles to progress; and (c) participants participated in intensive continued professional development opportunities. Participants provided suggestions for improved service delivery for children with hearing loss and their families in Virginia. These included mentorships for professionals, regionalized programs, specialized trainings, and workshops for the EI providers and the school-based SLPs together.

Additionally, a document analysis of core competencies for each participant group was completed using thematic and content analysis. Thematic analysis highlighted the differences

among the other professionals in the competencies. The document for the advanced certification as a Listening and Spoken Language Specialist (LSLS®; AG Bell 2007) was the only document that specifically addressed auditory skill development; it is not a required certificate and there were only two survey respondents holding the advanced certification. The standards for each regulatory document used different terms for coaching such as consultation or counseling in working with families. Content analysis showed the similarities and differences between the regulatory agencies core competencies and was used in the mixed method analysis.

The mixed methods analysis revealed how core competency areas, experiences, and job embedded coaching influenced the perceived comfort of EI providers. SLPs perceived lack of training was mirrored in the core competencies and resulted in unofficial job embedded coaching to provide quality services. For TDHH, the lack of auditory skill development and coaching in core competencies resulted in intensive and costly professional development. Developmental Specialists also did not have auditory skill development in their standards, but relied on their collaboration with audiologists and other professionals.

The mixed methods analysis also revealed the complexity of systems change for improving services for children with hearing loss in Virginia. When the findings of the quantitative and qualitative phases are brought together and compared to the Ambrose model (1987), there is a lack of vision, skills, resources, and action plan from the perspectives of the EI providers working with families of children with hearing loss.

### **Interpretation of Results**

The researcher investigated EI professionals perceived comfort with caregiver coaching and auditory skill development with the purpose of developing professional development programs for providers that work with children with hearing loss and families that have chosen

spoken communication methodologies. Findings from this research reaffirm the conclusions of Yoshinaga-Itano (2014) that current professional standards are not meeting the needs of young children with hearing loss and the JCIH (2013) position statement regarding professional skills. Additionally, the results bring to light not only areas for professional development, but the steps necessary to strengthen the system of supports in Virginia. The results of this research are interpreted for each of the professional designations in the context of the Ambrose model (1987) for: (a) professional standards; and (b) capacity building through professional development.

**Professional standards.** JCIH (2013) Goal 3-B stated that professionals who work with children who have a hearing loss should have specialized skills and knowledge. Specialized skills and knowledge extend beyond the minimum qualifications for each of the respective disciplines identified through the current study. The professional standards and findings from the current study, and of each professional designation, are presented with subsequent specialized training for EI professionals.

***Speech-Language Pathologists.*** The American Speech-Language Hearing Association (ASHA), which provides the national accreditation for SLPs, does not specifically require a course in auditory skill development for children with hearing loss whether they are using Listening and Spoken Language or American Sign Language, to receive national certification. The requirements for ASHA certification are considered minimal standards and professionals are trained generically across a wide-variety of communication difficulties. ASHA requirements change over time with increased knowledge likely based on current research. Previously, pre-service SLPs were required to complete a pre-determined number of supervised clinical hours working with adults or children with a hearing loss. This is no longer the case. Two recent graduates who were interviewed in the current research, were not required by their programs to

have a specific course in auditory skill development, but did have a course in auditory habilitation. Auditory skill development theoretically should have been embedded within an auditory habilitation course.

In contrast, two other SLPs had a required number of clinical hours for working with children who have a hearing loss as well as coursework in both audiology and aural habilitation. The SLP who showed the highest comfort with auditory skill development also received her training outside of Virginia, and reported having both clinical experience and coursework on Listening and Spoken Language. Consequently, her auditory skill development comfort score was more than two standard deviations above the mean for both the entire group of professionals and for SLPs. This SLP also works exclusively with children who have a hearing loss and their families.

Furthermore, the ASHA standards (2013) do not specifically address caregiver coaching, but rather reference ‘counseling’ of patients regarding communication disorders. Webster (1977) first defined counseling in communication disorders as: (a) receiving information a family wishes to share; (b) giving information; (c) helping families to clarify their beliefs; and (d) providing options for changing behaviors. Since that time, Holland (2007) defined counseling in Speech-Language Pathology as necessary to supporting family decisions for the improvement of the quality of life. The term ‘counseling’ from these definitions implies information sharing and listening. However, the current research on coaching has expanded past these definitions when applied to EI. Information sharing and listening encompass are only parts of coaching (e.g. see Table 4).

According to the Ambrose model (1987), SLPs reported a lack of skills and pre-professional training in the areas of auditory skill development and coaching, and when

necessary skills are missing, the result anxiety. Because mentorship experiences were informal and developed organically out of necessity, the value that SLPs placed on mentorship experiences is not surprising. However, the field has recognized the need to formalize mentorships. Dickson, Jones, and Morrison (2013) published a guide for mentors and mentees to monitor the growth of essential skills when the mentee strives to obtain the advanced LSLS® certification from the AG Bell Academy. The timeline for developing these skills is three years (Dickson et al., 2013). While this guide is comprehensive, it is not feasible for professionals working with a diverse caseload without administrative support for continued professional development. Additionally, professionals wanting to have a LSLS © mentor must seek out those professionals willing to provide the service and usually the mentor is paid for their time which can be cost prohibitive.

*Teachers for the Deaf/Hard-of-Hearing.* Yoshinaga-Itano and Wiggins (2016) highlighted the challenge in EI of children and families being provided services by generically trained SLPs or special education teachers without the families having access to TDHH. The *CEC Initial Specialty Set: Deaf and Hard of Hearing* (CEC, 2015) delineates essential knowledge and skills for beginning special education teachers who work directly with children who have a hearing loss. Like the ASHA (2013) standards, the CEC (2015) standards are considered minimal core competencies, do not address auditory skill development, but discuss developing competencies in communication options and knowledge of language development specifically for children with hearing loss. It could be inferred that the TDHH would be considered the “experts” in the education of children with hearing loss. However, the current research revealed the variability among providers within the same professional designation

indicating that the minimal standard for certification is not enough to provide quality services in the EI system.

According to the current research, the participant interviews revealed a wide disparity in the knowledge of auditory skills and coaching. The three TDHH interviews revealed varying levels of evidence for coaching and auditory skill development, but each of their individual comfort scores from the quantitative phase were above the group mean. Of the three TDHH interviewed, the one who had the highest comfort score for caregiver coaching and the second highest for auditory skill development, showed little to no evidence of either of these areas in her interview despite the extensive professional development she reported.

Traditional didactic professional development with a one-size fits all approach is not as effective as active, ongoing coaching, reflection, and performance-based feedback (Artman-Meeker et al., 2017; Fallon et al., 2015; Knight, 2009). Two TDHHs each reported professional development experiences that had components of ongoing professional coaching. One participated in the Carolina Summer Institute that paired the traditional didactic week-long seminars with a week-long hands-on application of knowledge with children and families while being coached by a seasoned professional providing real-time performance-based feedback. The professional connections made during the two-week intensive session were continued throughout the year, and beyond, with participants and professional coaches consulting as needed. Similarly, the other TDHH reported attending multiple traditional professional development opportunities in Virginia. To supplement these experiences, she valued her relationships with audiologists. Those relationships led to her being able to come to the local pediatric audiology practice and cochlear implant team to observe ABR assessments, cochlear implant mappings, and a cochlear implant surgery.

In addition to the variations in comfort skills for the defined constructs of this research, the TDHH reported variations in parental communication choice. Yoshinaga-Itano and Wiggins (2016) discussed their vision for children who are deaf or hard of hearing, which included family choice of communication options where the sign language and oral language debate is not an area of constant debate, parents having access to both options, and making their choice based on preference rather than availability of resources. The differences between the viewpoints of the TDHH in the current research are representative of the problems and challenges faced by families discussed by Yoshinaga-Itano and Wiggins (2016). The lack of vision aligns with the Ambrose model of systems change (1987) resulting in what Ambrose described as confusion.

The gap between the JCIH (2013) goal for parents to have access to qualified professionals in their chosen mode of communication and the reality of practice is underscored in the current study by two comments made by one TDHH during the interview process. She negated parental choice by stating, “It is a civil right for a Deaf person to choose sign language or speak – it is a civil right to choose your own language.” She also stated parental choice is “nice” and believes all “these children” will need sign. She stated that children with hearing loss will need to have ASL as a first language. Parents have guardianship over their minor children and the JCIH (2003) supports parents making informed choices. Professionals are obligated to present them with all choices without bias. EI practices also require that service providers plan services collaboratively with families based on family concerns, priorities, and resources. Regardless of parental communication choice, she reported having children start sign when she is working with them in Kindergarten. Clearly, for TDHH, the training needs center on the vision of what children with hearing loss can achieve when the JCIH 1-3-6 model is in place and the ever-changing roles of the providers.

***Developmental Specialists.*** Developmental Specialists are typically trained at university settings in early childhood programs and in practice they are responsible for children with myriad disabilities. The VA DOE *Program Status Matrix: 2007 Special Education Early Childhood (Birth – age 5)* is the guiding document for universities to incorporate core competencies to prepare students to become Developmental Specialists and these identified competencies were used in the development of the online training modules required for all Virginia EI providers. The VA DOE Matrix (2007) does not address auditory skill development, but does emphasize collaboration with other professionals more so than any of the other regulatory documents. The current research revealed that Developmental Specialists value their collaboration with audiologists. However, EI in Virginia does not directly employ audiologists. Audiological services are provided by outside agencies such as private medical practices or hospitals. Therefore, there is an assumption that pediatric audiologists are willing, and have the time, to devote to developing working relationships with Developmental Specialists when they may not be directly compensated monetarily. At a minimum, audiological records are shared with EI teams per parent request. However, is this best practice on the part of the pediatric audiologist or the early intervention provider? The JCIH guidelines (2013) Goal 7 stated that children with hearing loss should receive appropriate and ongoing audiological assessment and intervention. Within that goal, the JCIH (2013) directly stated that EI providers are expected to develop strong relationships with audiologists especially when the:

EI providers do not have specialized knowledge about the auditory skills and spoken language development of children with all types and degrees of hearing loss.

The current research affirms that the Developmental Specialists in Virginia value their collaboration with audiologists and the information they can share to provide quality services for

a family. A child with a hearing loss will typically have audiological appointments several times during the first few years of life. Establishing an ongoing and open working relationship requires effort on the part of both professionals. Furthermore, the JCIH (2013) Goal 7 listed 13 recommendations for monitoring the hearing of children identified with any type of hearing loss including the lesser-recognized hearing losses including fluctuating, unilateral, conductive, and auditory neuropathy.

Even though Developmental Specialists established their relationships with audiologists, their comfort with auditory skill development was one standard deviation below TDHH. JCIH Goal 7 addressed the critical role of the relationship between the audiologist and the EI provider on the premise that the Developmental Specialist doesn't have specialized training in "auditory skills and spoken language." While the JCIH is correct in their conclusion regarding skills of providers as evidenced by the qualitative and quantitative data from the current research study, it can be inferred from the JCIH statement that the audiologist has some specialized training in "auditory skills and spoken language." However, there is no evidence in their required coursework from ASHA to indicate audiologists have extensive knowledge in either of those areas (ASHA; 2013). The JCIH (2013) should have stated that the relationship between the Developmental Specialist and Audiologists is essential because the providers working with the child may not have knowledge of audiograms, hearing loss, speech acoustics, or amplification, as evidenced in the demographic data gathered during the quantitative phase of this research.

However, the JCIH (2013) and the current research documented that Developmental Specialists are not comfortable with auditory skill development for children using Listening and Spoken Language and that this is an identified area of need for continued professional development. Knight (2009) identified the various coaching models within professional

development for teachers. Job-embedded coaching with continuous and ongoing support are tied to success and positive change under the right conditions (Knight, 2009). Job-embedded coaching comprises several key characteristics that include being: (a) intensive and going; (b) grounded in partnership; (c) dialogical; (d) non-evaluative; (e) confidential; and (f) facilitated through respectful conversation. Given the value that Developmental Specialists place on collaboration and their strong caregiver coaching skills, job-embedded coaching for auditory skill development holds promise for improved services in Virginia. The use of the Ambrose model (1987) identified an area of need for Developmental Specialists in obtaining skills and knowledge for auditory skill development. Job-embedded coaching for this group of EI professionals could alleviate that frustration resulting in improved service delivery.

**Capacity building: professional development and improved service delivery.** Based on the findings of the current research, professional development can be designed to specifically meet the needs of professionals in Virginia. When results of the study are interpreted using the Ambrose model (1987), there is a lack of an action plan when considering the EI providers, their backgrounds, their beliefs, and their view of EI services for children with hearing loss in Virginia. Through professional development, an action plan can be developed by the professionals working directly with the families in conjunction with the leaders at state agencies to achieve the JCIH 1-3-6 plan.

The current research revealed the specific professional development needs of early intervention professionals working with children who have a hearing loss. Professional development can be built on mentorship experiences through technology that align with the model proposed by Knight (2009). Additionally, service delivery can be improved using structured programs and tele-medicine. The professional development needs are directly related

to strengthening the system of supports for families of children with hearing loss in Virginia through capacity building. Capacity building involves the development of an infrastructure to support medical or educational programs. In Virginia, for children with hearing loss this entails: (a) increasing the numbers of professionals trained to provide services; and (b) improving current service delivery through existing evidence-based programs.

***Mentorship through technology.*** The participant interviews revealed a theme of concern for families of children with hearing loss in Virginia. These concerns included the lack of providers throughout the state especially in rural communities. Additionally, the participants viewed services for children with hearing loss as different than other disability categories. Suggestions for establishing mentoring relationships were expressed by the SLPs as well as the TDHH. The characteristics of successful mentoring relationships described by Knight (2009) were also described by the participants. Establishing and maintaining a meaningful mentoring relationship is the backbone early professional's development when working with children who are DHH (ASHA, 2014; CEC, 2013). However, meaningful mentorship can also be true of seasoned professionals gaining experience in working with children with hearing loss using spoken language (Clem, DeMoss, & Wilson, 2012).

The expanded use of technology to connect individuals in professional mentoring relationships is a promising new endeavor. In the field of hearing loss, Clem et al. (2012) defined mentoring models using the one-to-one, peer-to-peer, group, or reverse mentoring processes. To meet the increased demand for qualified professionals, Clem et al. presented a conceptual framework for using distance technologies to provide mentees with more qualified mentors based on their supervisory needs and expectations. Artman-Meecker et al. (2017) used a multiple probe single case design with pre-service early childhood teachers to determine the efficacy of

performance feedback via email and then “bug-in-ear” real time feedback. The researchers’ results were promising for the intervention and maintenance phases.

Given that hearing loss is a low-incidence disability, the professional community must provide practical strategies for mentoring professionals. The use of tele-mentorship or eCoaching allows professionals to develop inter and intrapersonal relationships and increase their own content knowledge to implement Evidence Based Practices to a growing population of children with hearing loss being provided services in home and inclusive learning environments. Innovative professional development and mentorships hold the promise of increasing the numbers of professionals with advanced knowledge and skills for addressing language and fulfilling the expectations of Yoshinaga-Itano and Wiggins (2016) of families truly having a choice in their child’s communication methodology. A plan for addressing early intervention provider shortages for children with hearing loss can be outlined and expanded for Virginia. This begins with applying research from early childhood preschool teachers training into the early intervention setting. Furthermore, eCoaching in the EI system can extend beyond children with hearing loss and expand our current knowledge of the traditional Train-the-Trainer model.

***Tele-intervention.*** Technological advancements have opened the door to distance technologies in providing services to families, also known as tele-practice, tele-therapy, or tele-intervention and are being utilized by therapists in working with children who are deaf (Hamren & Quigley, 2012; Houston, 2014). Using tele-intervention as a method of service delivery, trained professionals coach caregivers on how to interact with their children while meeting specific goals related to the child’s auditory, speech, and language development. The therapist may never meet the child or family face-to-face. The amount of time for each service delivery model should remain constant and based on the child’s needs. However, there are no research

studies completed to compare the amount of time each model would need to be implemented effectively. The American Speech-Language Association (ASHA) has a working group specifically for practitioners who engage in tele-practice to discuss billing, obstacles, and adherence to the ASHA Code of Ethics. This group developed a formal position statement regarding tele-practice that states tele-practice is a viable form of service delivery, but more research is needed in this area (ASHA, 2010). Participant interviews revealed concern regarding access to early intervention services in Virginia for children with hearing loss and tele-intervention is a reasonable response to these concerns. However, the regulations for implementing telehealth or telemedicine services are guided by insurance reimbursement and Medicaid billing. In 2016, Virginia amended Virginia Code § 38.2-3418.16 to expand insurance coverage for tele-medicine based services. Service that can be provided include: (a) evaluation and management; (b) psychiatric care; (c) specialty medical procedures; (d) speech therapy; and (e) radiology services and procedures. However, Virginia Medicare/DMAS uses a hub and spoke model for telemedicine requiring that the patient be at an originating site in the presence of another care provider. This means that the family would have to either: (a) travel to the closest Medicaid provider; or (b) a Medicaid provider be on each end of the telemedicine session. EI developmental services can be billed through Medicaid. This is not true for private payer reimbursement since the change in the Virginia Code. Virginia approved telemedicine for commercial insurances across the board. Once again, the system of supports only supports wealthy families who are the most likely to partake in private services.

## **Implications**

Results from this research provide a basis for improvements to current professional development in early intervention, policy initiatives at the state level, and future research conducted within Virginia.

**Practice.** Findings from the current research have implications for professional development of early intervention providers in Virginia using the recommendations of Knight (2009) to expand current perceptions of traditional Train-the-Trainer approaches and embrace eCoaching. During the participant interviews, one TDHH suggested developing a mechanism to link new professionals or professionals without experience working with children who have a hearing loss to those that have not only content-specific knowledge, but extensive experience in early intervention. This would be a model similar to the one described by the SLPs, but more formal in nature. There are initiatives currently under development to increase the support that professionals receive when working with children that have a hearing loss in EI. The Virginia Early Hearing Detection and Intervention (EHDI) Advisory Council meets quarterly and each representative from various stakeholder groups report on state-wide initiatives. Stakeholders include state agencies and consumer groups. At the September 22<sup>nd</sup>, 2017 meeting of the Virginia EHDI Advisory Council, officials from the Virginia Department of Health (VDH) announced a new initiative for Professional Learning Communities (PLC) that will be piloted in northern Virginia over the next several months under the direction of the Centers for Disease Control. The goal of the PLC will be to improve loss to follow-up using a bottom-up approach. Additionally, it was reported by representatives from the Virginia Department of Health that the Centers for Disease Control (CDC) estimates that the commonwealth should be identifying 300 babies across the state with hearing loss through UNHS each year. However, the most recent

data from the CDC (2014) showed that Virginia identified only 156 children through the UNHS process. The numbers reported and expected by the CDC indicated the first area of weakness within the Joint Committee on Infant Hearing (JCIH) 1-3-6 model.

The information provided by VDH indicated that the numbers of children with hearing loss entering the early intervention system are expected to rise quickly. Given the results of the current research, we now have some specific information regarding what the professionals believe they need and how best to support them. However, the sample size was small, and the current research can be used in conjunction with professional development currently being planned by VDH and Part B mechanisms. Virginia has an opportunity to build capacity through professional development if the state leaders act quickly and methodically. First, funding through grants is essential to create new positions within the early intervention system for professional development facilitators. The role of the facilitators would be to provide the “bug-in-ear” job-embedded coaching consistent with the characteristics described by Knight (2009) moving away from a one size fits all approach. Tailoring professional development to meet the specific needs of individual providers using technology will be cost-effective and more efficient than providing the traditional didactic trainings. This initiative also leads the way to expanded research as Artman-Meeker et al. (2017) studied early childhood preschool teachers and specifically targeted students with Autism. Data collection will also allow researchers to tie professional development of provider interventions to child language development or performance thus increasing evidence-based practices consistent with JCIH (2007) goals.

Second, Virginia has established several specialty programs and centers for professionals and families to access for students with Autism. The time has come to develop a similar program for our children with hearing loss or any sensory disability. Currently, the closest

neurodevelopmental psychologist that specializes in differential diagnosis of children with hearing loss and other disabilities is in Baltimore, Maryland at the DREAM clinic (Deafness-Related Evaluations and More). Virginia currently owns a facility to house such a program at the Virginia School for the Deaf and Blind (VSDB) in Staunton. Student enrollment at VSDB is at an all-time low with staff serving fewer than 100 students with hearing loss. The facility itself is large enough to be the physical home of an outreach program for both Part B and Part C providers, families, and researchers. This facility has the potential to include continuing education classes through both on campus and online mediums as well as mentorship opportunities. Ideally, the center would have a clinic that meets periodically to: (a) assess children to make differential diagnoses; and (b) make appropriate medical and educational referrals. A team comprised of pediatric otolaryngologists, pediatric audiologists, TDHH, vision specialists, SLPs, neurodevelopmental specialists, social workers, and related service providers meeting quarterly to complete these evaluations would dramatically change services and supports provided for children with sensory disabilities. A clinic of this magnitude would require the cooperation of several private and state agencies. The center could also be home to the professional development facilitators and provide services to school divisions for technical assistance. The center could also be a catalyst for expanded research, close the gap between medical and educational professionals, close the gap between research and practice, and provide essential services for the children of Virginia who otherwise travel out-of-state to obtain needed care. Additionally, this project would repurpose a newly renovated struggling school with a 10 million dollar a year state budget that is one of ten state agencies with the highest growth rate in general fund appropriations from fiscal years 2007 – 2016 (Joint Legislative and Audit and Review Commission, 2016).

Finally, the one training program for TDHH, located at Radford University, is insufficient to meet the staffing needs of EI programs and school divisions. In August, this researcher met with a representative of one of the state universities to propose a new TDHH program for the state. Graduate program development is an arduous process and will not be completed quickly if the university community decides to begin this new endeavor. Beginning with a minor in Deaf/Hard-of-Hearing Studies tied to the early childhood program would increase the numbers of professionals with exposure to this low incidence population. Dolman (2008) showed the changing role that TDHH have in schools as self-contained classrooms are no longer the norm, mainstream settings are considered the least restrictive environment, and TDHH skills are needed in the EI system. Universities with strong special education programs, and strong early childhood special education programs, are prime environments to begin training the next generation of TDHH.

**Policy.** State and national policies are indicators of the current values of the people for which or by which they are written. This study indicated that at the national level, policy changes are necessary for the various certifications. First, the decrease in accountability from ASHA regarding direct contact hours required in working with children and adults that have a hearing loss has had a negative impact the knowledge base of graduates as evidenced by the interviews with current SLPs. It is not practical at this time to go back to the old system, or develop a new system of requirements, to meet the needs of a low incidence disability. Additionally, the opportunity for Developmental Specialists to complete additional graduate level coursework when they are providing services to a multitude of disabilities is not feasible. So, changes must be made at the state level. These changes include development of advanced professional development opportunities and required, specialized continuing education to raise the minimum

skills and knowledge standards of providers working with children who have a hearing loss. While this may seem like an enormous undertaking, Virginia has resources at its disposal including: (a) ten practicing LSLS Cert. AVT and AVEd®; (b) four cochlear implant centers with highly trained audiologists, therapists, and physicians; (c) two state-level administrators dedicated to working with professionals providing services for children with hearing loss (Part C and Part B); (d) professionals at the VCU Partnership for People with Disabilities providing technical assistance for early intervention and for hearing loss; (e) an active EHDI advisory council; and (f) legislative awareness of the difficulties present in the system. Also, instituting a requirement that each child with a hearing loss identified must have one member of their EI team with extensive knowledge, and advanced coursework, in the families chosen mode of communication. This means that an SLP, TDHH, or Developmental Specialist working with that family will have a background in deafness or hearing loss consistent with JCIH goal three (2013).

Additionally, there is a drafted piece of state legislation that has the possibility of being submitted in January 2018 to the General Assembly of Virginia to develop a committee, representative of parents and professionals, the purpose of which is to make recommendations on how to strengthen the system of supports for families of children with hearing loss from birth to age eight. Issues that this committee may be able to tackle include the findings from the current study regarding professional preparation and the concerns brought forth from the professionals including the critical shortage of trained EI providers. This is one example of how policy initiatives are directly tied to practice.

**Research.** This exploratory study's findings and limitations lay a foundation for future research in an area of professional development of EI professionals that has previously gone

unexplored. There is opportunity to: (a) study and improve the vocabulary used by various national and state organizations; (b) expand the current research to other states; (c) study child language outcomes and professional development; and (d) study the perspectives of parents receiving services for their children with hearing loss in the Part C system.

First, families and children with hearing loss are provided services from a wide-range of professionals from varying educational backgrounds. As this research shows, semantics are important. The language used across each of the disciplines should be consistent with regards to coaching. Developmental specialists are trained in coaching families consistent with IDEA (2004) and family-centered practices. ASHA and CEC core competencies continue to focus on “counseling” and have not progressed in their expectations of providing family-centered practices. A shift in the use of “coaching” versus “counseling” signals a change in expectation from merely informing families of the effects of hearing loss or their choices for visual and verbal languages, to truly working collaboratively with them for children to develop language commensurate with their hearing peers. The change in semantics has the potential to have an impact on the services provide families from professionals of varying professional backgrounds.

Second, the results from this study are specific to Virginia. Expansion of the current research to states with similar loss to follow-up, as well as those with an established framework of linking services from their Departments of Health and Education, would provide valuable tools for states that struggle in decreasing loss to follow-up and improving access to services. These services include families having all communication and language options available to them as visualized by Yoshinaga-Itano and Wiggins (2016).

Additionally, Virginia has the unique opportunity to study child language outcomes in the context of a changing system including the development of a specialty center or increased

training programs for pre-service professionals. Specific areas of research could include: (a) a longitudinal study of state indicator data with improvements in professional development and increases in providers; (b) pre- and post-assessment of child and family outcomes using comparisons of EI providers practices; (c) exploration of eCoaching using “bug-in-ear” technology in combination with traditional didactic development; or (d) exploration of caregiver participation and engagement in EI sessions and comparison of EI providers background.

However, the first step in expanding the current research would be to link the results of self-assessments of comfort levels to qualitative observations of EI sessions with evidence of coaching and auditory skill development over time. Once these data are collected, single-case methodologies could be used to research the effectiveness of eCoaching and the “bug-in-ear” feedback coupled with tailored professional development based on professional background.

Finally, the perspectives of families and their stories were not included in the current research, but need to be addressed. The purpose of this research centers on improving services for families of children with hearing loss. Therefore, it is essential that the experiences of families who have benefited from the EHDI 1-3-6 system, as well as those who have not, be explored. Only by exploring the viewpoints of those that did not benefit from the system can supports be implemented to strengthen the infrastructure and ensure that families receive the services they are entitled. In turn, families and children with hearing loss will no longer have detrimental delays in social, academic, and language skills thereby improving their overall quality of life.

### **Limitations**

This study made the following assumptions: participation was voluntary; the link to the survey that was given to service coordinators throughout Virginia was disseminated and anyone

wanting to participate was made aware of the study and was able to do so; and the data generated from the completed survey and interviews provided meaningful findings. The unique demographics of Virginia and Early Intervention providers may not be representative of the larger national population or other states, consequently external validity is limited. The ability to generate a response rate and generalize demographic characteristics is limited as the exact population of early intervention providers for children specifically with hearing loss cannot be obtained through any known database or certification list. The EI providers that responded may not be representative of each of the geographic areas of Virginia. Additionally, the researcher is known to many EI providers in the state due to her being a LSLS Certified AVT ® and as such, EI providers who have views differing from the researcher may have chosen to not participate in any part of the research or participate in interviews resulting in the research results being skewed.

Additionally, selection bias is a limitation within this study. Sampling of all early intervention providers in Virginia was completed to minimize the effects. Lower response rates can partially be attributed to the low numbers of children with hearing loss being provided early intervention services in Virginia. However, early intervention providers not familiar with auditory skill development may not have chosen to participate in the study. Many of the early intervention providers that did choose to participate in the study self-reported high-levels of comfort with auditory skill development despite not having extensive graduate training or professional development. These findings are inconsistent with the current literature (Yoshinaga-Itano, 2014; JCIH, 2013). Therefore, the participants may have self-reported skills that they are not able to implement while providing early intervention services.

Creswell (2006) identified delimitations used to narrow the scope of the study by indicating what is not included in the study. Only the perspectives of early intervention professionals are investigated, and their perspectives cannot be generalized to parents of children with hearing loss or professionals serving students through Part B of IDEA (2004). This study did not generate knowledge regarding services for persons with disabilities other than hearing loss. The viewpoints of adults with hearing loss, children with hearing loss, or related service providers are not considered. Thus, the findings cannot be applied to parents, other professionals, or other disability populations. Finally, the study only included those professionals providing EI services in Virginia.

### **Conclusion**

This mixed method study examined the relationship between the EI provider's background and their comfort with caregiver coaching and auditory skill development. The results reaffirmed the gaps highlighted by Yoshinaga-Itano (2014) regarding the needs of children and families using listening and spoken language in order to fulfill expectations of the JCIH 1-3-6 model in Virginia. Through this research, the providers and their professional designations were identified, and their voices were prominent. These professionals are key stakeholders in the system of supports for families of children with hearing loss. Their desire for strengthened professional development, specific to their needs, using professional mentorships was at the forefront. Although this study extended existing research, work regarding how to implement meaningful coaching of professionals is not complete. The combination of changes in training and supports for EI professionals, addition of innovative state-wide programs, legislative support, and new research initiatives hold the promise of realizing the world envisioned by Yoshinaga-Itano and Wiggins (2016) where children with hearing loss are afforded the same

opportunities as their hearing peers, accomplish commensurate language levels, and their futures are guided by parental choice rather than availability of resources.

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## **RESEARCH SUBJECT INFORMATION AND CONSENT**

**TITLE:** A Mixed-Methods Investigation of Caregiver Coaching in an Early Intervention Model: Differences in Providers for Children with Hearing Loss

**VCU IRB NO.:**

**INVESTIGATOR:** Alison King, Doctoral Candidate

If any information contained in this consent form is not clear, please ask the study staff to explain any information that you do not fully understand. You may have a copy of this consent form to think about or discuss with family or friends before making your decision.

### **PURPOSE OF THE STUDY**

The purpose of this research study is to explore the educational background and perceptions of Early Intervention providers regarding caregiver coaching and auditory skill development of children who are Deaf/Hard-of-Hearing. You are being asked to participate in this study because you are an Early Intervention provider in Virginia.

### **DESCRIPTION OF THE STUDY AND YOUR INVOLVEMENT**

If you decide to be in this research study, you will be asked to sign this consent form. In this study, you will be asked to complete an online survey lasting approximately 20 minutes. The survey will consist of demographic information such as your area of specialty (ex. Teacher for the Deaf/Hard-of-Hearing, Speech-Language Pathologist, or Early Intervention Specialist), gender, age, and years of experience. You will also be asked about your educational background with regards to specific coursework. You will also be asked to complete a self-assessment of your comfort level with auditory skill development and caregiver coaching in an Early Intervention model. Finally, you will be asked to be considered for participation in a one-on-one interview at a later date and provide your contact information. One-on-one interviews will last approximately one hour at a convenient location to you or by phone. There will be no monetary compensation for participation in the study.

If you agree to participate, you will be given the link to the online survey. If you agree to be interviewed, the interview will be audiotaped. In the event that you do not wish for the interview to be audiotaped, the researcher will take written notes during the interview. Audiotaped interviews will be transcribed and analyzed for the purposes of the research study. All interviews will be kept confidential, and only pseudonyms will be used when reporting the results from the study. The researcher will remove any personal information that can lead to your identification. After the interview is completed and transcribed, you will be sent a written copy of your interview to verify the content. This is done so that you can be sure your views are accurately expressed.

## **RISKS AND DISCOMFORTS**

Sometimes talking about these subjects causes people to become upset. Several questions will be asked about your educational experiences and how this applies to your practices in Early Intervention. You do not have to talk about any subjects you do not want to talk about, and you may leave the interview at any time. Participation in the study is voluntary. Participants can choose not to answer any portion of the online survey or to discuss any particular issue during the interview. Should any problems arise during the course of the study, participants are encouraged to contact the principal investigator, Dr. Donna Gilles. You may also withdraw from the study at any time and/or withdraw the data gathered for the research prior to data analysis.

## **BENEFITS TO YOU AND OTHERS**

You may not get any direct benefit from this study, but, the information we learn from people in this study may help us design better programs for professional development in Virginia.

## **COSTS**

There are no costs for participating in this study other than the time you will spend being interviewed and filling out the survey questions.

## **CONFIDENTIALITY**

Potentially identifiable information about you will consist of survey and interview notes and recordings. Data is being collected only for research purposes. Your data will be identified by participant numbers for the online survey. For the interviews, the researcher will use pseudonyms for participants to maintain confidentiality and all recordings will be disposed of after transcription. No personal identification will be collected. Other records, will be on encrypted jump drives and kept in a secure online site after the study ends and will be destroyed at that time. Interview notes and survey results will be kept until after the study is completed and will then be destroyed. Access to all data will be limited to study personnel. Data and safety monitoring plan are established.

The researcher will not tell anyone the answers you give us; however, information from the study and information from your interview and the consent form signed by you may be looked at for research or legal purposes by the principal investigator, or by Virginia Commonwealth University.

## **VOLUNTARY PARTICIPATION AND WITHDRAWAL**

You do not have to participate in this study. If you choose to participate, you may stop at any time without any penalty. You may also choose not to answer particular questions that are asked in the study.

Your participation in this study may be stopped at any time by the study staff without your consent. The reasons might include:

- the study staff thinks it necessary for your health or safety;

- you have not followed study instructions;
- administrative reasons require your withdrawal.

## **QUESTIONS**

If you have any questions, complaints, or concerns about your participation in this research, contact:

Alison King, Doctoral Candidate  
VCU Department of Audiology  
403 North 11<sup>th</sup> Street  
Nelson Clinic, Room 304  
Richmond, VA 2321950  
(804) 380-9650  
kingar3@vcu.edu

Dr. Donna Gilles, Principal Investigator  
VCU Partnership for People with Disabilities  
PO Box 843020 Richmond, VA 23284-3020  
(804) 828-8244  
dlgilles@vcu.edu

The researcher/study staff named above is the best person(s) to call for questions about your participation in this study.

If you have any general questions about your rights as a participant in this or any other research, you may contact:

Office of Research  
Virginia Commonwealth University  
800 East Leigh Street, Suite 3000  
P.O. Box 980568  
Richmond, VA 23298  
Telephone: (804) 827-2157

Contact this number to ask general questions, to obtain information or offer input, and to express concerns or complaints about research. You may also call this number if you cannot reach the research team or if you wish to talk with someone else. General information about participation in research studies can also be found at <http://www.research.vcu.edu/irb/volunteers.htm>.

## **CONSENT**

I have been given the chance to read this consent form. I understand the information about this study. Questions that I wanted to ask about the study have been answered. My electronic

signature says that I am willing to participate in this study. I will receive a copy of the consent form once I have agreed to participate.

---

Participant name printed

Participant signature

Date

## Appendix B – Email Solicitation for Study Participation

Dear \_\_\_\_\_,

My name is Alison King and I am a Speech-Language Pathologist in Virginia studying professional preparation of early intervention providers and caregiver coaching as part of my dissertation. I am contacting you because you work with children receiving early intervention in Virginia and have completed the online training modules offered through the Infant & Toddler Connection of Virginia.

If you would be willing to complete a short survey regarding your training and experiences in early intervention, please click the link contained in this email. The survey should take 15-20 minutes to complete and begins with providing more information regarding this study. If I have not heard from you in two weeks, I will send a follow-up email regarding your willingness to participate in this study.

I appreciate your time willingness to participate in this research. If you have questions regarding this study, please feel free to reply to this email or call me directly at (804) 380-9650.

Sincerely,

Alison R. King  
Doctoral Candidate  
Virginia Commonwealth University  
Richmond, Virginia  
Kingar3@vcu.edu

Appendix C – Email Solicitation for Follow-Up Interview Participation

Dear \_\_\_\_\_,

Thank you again for your completing the survey associated with my research on professional preparation and caregiver coaching in early intervention in Virginia. I am writing to ask if you would be willing to participate in a follow up interview, by phone or in person, about your experiences in early intervention and your educational training. I am interested in learning about the impact of your professional development on your caregiver coaching and knowledge of auditory skill development. The interview would take approximately 30-60 minutes and can be scheduled at your convenience.

If you would like to participate, please reply to this email or call me directly at (804) 380-9650 so we can schedule a time to talk. Thank you for your time in considering this opportunity.

Sincerely,

Alison King  
Doctoral Candidate  
Virginia Commonwealth University  
Kingar3@vcu.edu

## Appendix D– Survey

**Title:** A Mixed-Methods Investigation of Caregiver Coaching in an Early Intervention Model: Differences in Providers for Children with Hearing Loss

### Survey Introduction:

The purpose of this research study is to explore the educational background and perceptions of Early Intervention providers regarding caregiver coaching and auditory skill development of children who are Deaf/Hard-of-Hearing. You are being asked to participate in this study because you are an Early Intervention provider in Virginia.

If you agree to participate, you will be asked to complete an internet-based survey. The survey should take approximately 20 minutes to complete. There are four sections. The first section consists of 5 demographic questions about your work experience. In the second section you will be asked about your undergraduate and graduate training for working with children who have a hearing loss. In the third section, you will provide brief information about your caregiver coaching practices and report on your level of expertise with auditory skill development. At the end of the survey, you will be asked if you are willing to participate in an interview regarding your own experiences.

**Risks:** There are no foreseeable risks for participating in this research.

**Benefits:** The results from this survey will be used in the development of professional training programs for early intervention providers.

**Confidentiality:** All data collected from this internet-based survey will be confidential. Names and any identifying information will not be placed on surveys or other data. Your responses will not be identifiable to you personally. All data will be incorporated into group data and no individual demographic data will be shared. Reasonable efforts are made to protect the confidentiality of your transmissions with the understanding that no computer transmission is completely secure. It is recommended that you close your computer browser after completion of the survey.

**Participation:** Completing this survey is completely voluntary. You may skip items or exit the survey at any time. There are no costs to you for participating in this research. If you have additional questions, please feel free to contact Alison King at (804) 380-9650 or kingar3@vcu.edu.

I have read the confidentiality and disclosure statement and agree to participate in the following survey.

- Yes
- No

### **Part 1: Demographics**

1. What is your area of specialty?
  - a. Teacher for the Deaf/Hard-of-Hearing
  - b. Speech-Language Pathologist
  - c. Developmental Specialist
  - d. Auditory-Verbal Therapist
  - e. Other \_\_\_\_\_
2. What part of Virginia do you provide services? (indicate all)
  - a. Tidewater
  - b. Piedmont
  - c. Blue Ridge
  - d. Valley and Ridge
  - e. Appalachian Plateau
3. Your gender
  - a. Male
  - b. Female
  - c. Prefer not to answer
4. Your age:
  - a. 22-35
  - b. 36-45
  - c. 46-60
  - d. 61+
5. I am certified to provide early intervention services in Virginia.
  - Yes
  - No
6. I feel comfortable providing services to children with hearing loss using the following communication methodologies:
  - a. American Sign Language
  - b. Total Communication
  - c. Cued Speech
  - d. Auditory Oral
  - e. Auditory-Verbal
  - f. Other \_\_\_\_\_
7. I have provided services for children with hearing loss since receiving my degree.
  - Yes
  - No
8. I have worked in EI with children who have a hearing loss within the past 5 years.

- Yes
- No

**If yes, participants continue survey.**

**If no, question number 9 is given.**

9. If you have not worked with children with hearing loss within the last five years, are you comfortable in working with this population?
- Yes
  - No

**If yes, participants continue survey.**

**If no, participants receive the following message:**

Thank you for your participation in this survey, if you have any questions or concerns please feel free to contact Alison King at (804) 380-9650 or kingar3@vcu.edu. Your participation is greatly appreciated.

## **Part 2: Preparation and Training**

If you are willing to complete a follow-up interview regarding your experiences in early intervention, please give your email address and you will be contacted shortly. Your views are important and necessary to design professional training programs for early intervention providers in Virginia. Thank you!

(Enter email address here)

10. Indicate the highest level of training received.
- a. Bachelor's
  - b. Master's
  - c. Post-graduate training (ex. Completion of VA Leadership in Neurodevelopmental Disabilities – LEND)
  - d. Doctorate
  - e. If you have more than one degree in each area, please specify all areas you hold degrees in. \_\_\_\_\_
11. Number of years of experience post-graduation.
- a. 1-5
  - b. 6-10
  - c. 11-15
  - d. 16-20
  - e. 21+
12. Number of years of experience working with children who have a hearing loss.
- a. 1-5
  - b. 6-10
  - c. 11-15

- d. 16-20
  - e. 21+
13. Number of years of experience working in early intervention.
- a. 1-5
  - b. 6-10
  - c. 11-15
  - d. 16-20
  - e. 21+
14. What certifications/licenses do you hold?
- a. ASHA Certificate of Clinical Competence
  - b. Council on Education of the Deaf
  - c. Teacher licensure in Virginia. List areas: \_\_\_\_\_
  - d. Listening and Spoken Language Specialist
  - e. National Teacher Certification
  - f. Virginia Department of Health Professions License
  - g. Other: \_\_\_\_\_

**College Instruction**

15. Undergraduate

For each area below, indicate the amount of undergraduate college instruction you had in each area. Also, indicate if in that area you had a workshop or practicum.

	None	One Lecture	Several Lectures	Entire Course	Workshop	Practicum
Audiology						
Aural Habilitation						
Listening and Spoken Language						
Auditory Strategies						
Auditory Skill Development						
Caregiver Coaching						
Cochlear Implants						
FM Technology						
Child and family performance indicators of IDEA Part C						

16. Graduate

For each area below, indicate the amount of graduate college instruction you had in each area. Also, indicate if in that area you had a workshop or practicum.

	None	One Lecture	Several Lectures	Entire Course	Workshop	Practicum
Audiology						
Aural Habilitation						
Listening and Spoken Language						
Auditory Strategies						
Auditory Skill Development						
Caregiver Coaching						
Cochlear Implants and Hearing Aids						
FM Technology						
Child and family performance indicators of IDEA Part C						

17. Did you observe or work with children who had hearing loss in graduate/undergraduate clinics or externships?
  - a. Yes
  - b. No
18. Did you observe or work with children who had hearing loss in graduate/undergraduate early intervention settings where services were provided in the home or a community setting?
  - a. Yes
  - b. No
19. Please check all areas where you have attended workshops or seminars post-graduation.
  - a. Cochlear implant technology or assistive technology
  - b. Auditory-Oral communication options including Listening and Spoken Language
  - c. Auditory Skill Development
  - d. Habilitation/Rehabilitation strategies with hearing loss
  - e. Caregiver Coaching
  - f. Child and family performance indicators of IDEA Part C
20. Overall, how well do you feel that your college experiences have prepared you to provide services to children with hearing loss in early intervention?
  - a. Very confident
  - b. Somewhat confident
  - c. Neutral
  - d. Lacking confidence
  - e. No confidence
21. Indicate what areas you believe you want to receive professional development in order to serve families of children with hearing loss.

	Yes	No	Maybe
Audiology			
Aural Habilitation			
Listening and Spoken Language			
Auditory Strategies			
Auditory Skill Development			
Caregiver Coaching			
Cochlear Implants and Hearing Aids			
FM Technology			
Child and family performance indicators of IDEA Part C			

### Part 3: Caregiver Coaching and Auditory Skill Self-Assessment

Please complete this brief self-assessment of your comfort with the following caregiver coaching behaviors used with caregivers of children with hearing loss. A scale of 1-5 is being used with 1 being “never”, 3 being “sometimes”, and 5 being “always.” Your answers are confidential.

	Never	2	Sometimes	4	Always
	1	2	3	4	5
Providing the family with individualized strategies					
Use materials available in the home					
Focusing on the family routines					
Bring in materials to use for EI sessions					
Providing information to family regarding development					
Observing the caregiver-child interaction					
Directly working with the child and the caregiver is NOT present					
Directly working with the child and the caregiver is present					
EI sessions provided in the home					

EI sessions provided in the daycare setting					
Facilitation of language through increasing awareness of primary caregivers influence over development					
Direct modeling of strategies followed by guided practice					
Focus on caregiver-child interactions					
Assist families in generating ways to facilitate language throughout the day					
Focus on child behavior					
Providing the family with written feedback					
Guiding the parents through activities					
Teaching parents language facilitation strategies including:  (a) <i>Closed-ended questions</i> (b) <i>Open-ended questions</i> (c) <i>Modeling</i> (d) <i>Parallel talk</i> (e) <i>Expansion</i> (f) <i>Linguistic mapping</i> (g) <i>Responsivity</i> (h) <i>Wait time</i> (i) <i>Imitation</i> (j) <i>Commenting</i> (k) <i>Observing</i> (l) <i>Forced choice</i> (m) <i>Turn-taking</i> (n) <i>Other</i>					

Please complete this brief self-assessment of your level of comfort with intervention targeting following auditory skills for children with hearing loss. A scale of 1-5 is being used with 1 being “novice”, 3 being “comfortable”, and 5 being “expert.” Your answers are confidential.

	Novice		Comfortable		Expert	
	1	2	3	4	5	NA
Sound awareness						
Detection of environmental noises						
Detection of speech sounds						
Detection of the Ling 6 Sounds						
Learning a conditioned response to sound						
Localization of sound						
Response to name being called						
Development of consonant discrimination						
Hierarchy of consonant development by audition						
Hierarchy of vowel development by audition						
Development of auditory feedback loop						
Auditory feedback for suprasegmental features of speech						
Auditory feedback for words and sentences						
Auditory discrimination of critical elements						
Identification of objects by description						
Closed and open set discrimination						
Closed and open set comprehension						
Auditory sequencing of directions						
Auditory memory						
Strategies for making acoustic signal salient						
Use of acoustic highlighting						
Speech acoustics and the impact on development						
Use of Learning to Listen Sounds						

Thank you for your participation. If you have any questions, please contact Alison King at (804) 380-9650.

## Appendix E: Interview Questions

Tell me about your educational background.

Tell me specifically about what courses or experiences helped to prepare you to work with children that have hearing loss and their families.

Tell me about your background with Early Intervention.

How comfortable are you with providing listening and spoken language intervention to children with hearing loss?

What caregiver coaching practices do you currently use?

How do you feel about caregiver coaching in an EI model?

Tell me about your collaboration with other professionals. Who is on your interdisciplinary team?

How did your education prepare you to provide caregiver coaching?

Are you familiar with the performance indicators for family and children required by Part C of IDEA? Can you explain how to best accomplish the goals with regards to developing communication in children with hearing loss?

What are your thoughts about providing caregiver coaching regarding auditory skills in children with hearing loss?

How do you integrate caregiver coaching and auditory skill development?

What professional development experiences do you believe would be beneficial to you? What professional development experiences do you believe would be beneficial to other providers in Early Intervention?

## Appendix F: A Priori Codes

Beginning list of A Priori Codes – Based on Literature Review

<b>Group</b>	<b>Code</b>	<b>Definition</b>	<b>Type</b>
TDHH/SLP/DS	AS	Auditory Skills (non-specific)	A Priori
TDHH/SLP/DS	R	Regulatory (i.e. ASHA, CEC)	A Priori
TDHH/SLP/DS	P	Policy (i.e. IDEA)	A Prior
TDHH/SLP/DS	GT	Graduate Training	A Priori
TDHH/SLP/DS	IS	Individualized strategies	A Priori
TDHH/SLP/DS	FR	Family routines	A Priori
TDHH/SLP/DS	CC	Facilitation through caregivers	A Priori
TDHH/SLP/DS	DM	Direct modeling	A Priori
TDHH/SLP/DS	CCI	Caregiver-Child Interactions	A Priori
TDHH/SLP/DS	DP	Daily practice	A Priori
TDHH/SLP/DS	PIP	Providing information to the parent	A Priori
TDHH/SLP/DS	OB	Observation during EI session	A Priori
TDHH/SLP/DS	AAQ	Asking and answering questions	A Priori
TDHH/SLP/DS	GPF	Guided practice with feedback	A Priori
TDHH/SLP/DS	JI	Joint interaction	A Priori
TDHH/SLP/DS	NC	No coaching	A Priori
TDHH/SLP/DS	CF	Child focused	A Priori
TDHH/SLP/DS	PS	Problem-solving	A Priori
TDHH/SLP/DS	REF	Reflection	A Priori
TDHH/SLP/DS	AST	Auditory Strategy	A Priori
TDHH/SLP/DS	AA	Auditory Awareness	A Priori
TDHH/SLP/DS	AD	Auditory Discrimination	A Priori
TDHH/SLP/DS	AM	Auditory Memory	A Priori
TDHH/SLP/DS	AC	Auditory Comprehension	A Priori
TDHH/SLP/DS	AI	Auditory Identification	A Priori
TDHH/SLP/DS	IS	Increased skills	A Priori
TDHH/SLP/DS	PD	Professional development	A Priori
TDHH/SLP/DS	Pre	Prepared	A Priori
TDHH/SLP/DS	AON	Area of need	A Priori
TDHH/SLP/DS	LFT	Language Facilitation Techniques (a) <i>Closed-ended questions</i> (b) <i>Open ended questions</i> (c) <i>Modeling</i> (d) <i>Parallel talk</i>	A Priori

		(e) <i>Expansion</i> (f) <i>Linguistic mapping</i> (g) <i>Responsivity</i> (h) <i>Wait time</i> (i) <i>Imitation</i> (j) <i>Commenting</i> (k) <i>Observing</i> (l) <i>Forced choice</i> (m) <i>Turn-taking</i> (n) <i>Other</i>	
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Emergent Codes – Initial set of codes developed from the interviews with TDHH, SLPs, and Developmental Specialists

<b>Group</b>	<b>Code</b>	<b>Definition</b>	<b>Type</b>
TDHH/SLP/DS	CI	Cochlear Implants	Emergent
TDHH/SLP/DS	Coll	Collaboration	Emergent
TDHH/SLP/DS	Dev	Development	Emergent
TDHH/SLP/DS	AON	Area of need	Emergent
TDHH/SLP/DS	PC	Personal characteristics	Emergent
TDHH/SLP/DS	JT	Job Training	Emergent
TDHH/SLP/DS	Assess	Assessment	Emergent
TDHH/SLP/DS	CON	Concern	Emergent
TDHH/SLP/DS	FRU	Frustration	Emergent

## Vita

Alison Ruth King was born January 12<sup>th</sup>, 1975 in Norfolk, Virginia and is an American citizen. She was raised in Carteret County, North Carolina and graduated from West Carteret High School in Morehead City in 1993. Alison attended Appalachian State University and received her Bachelor of Science in Communication Disorders with a minor in Psychology in 1997. She received a Master of Speech-Pathology degree from the University of South Carolina with a concentration in Aural Habilitation after an externship with the Listening Center at Johns Hopkins Hospital in 1999. She began her career at a not-for-profit in Richmond, Virginia specializing in Auditory-Verbal Therapy. While there, she obtained her Certificate of Clinical Competence in Speech-Language Pathology. Alison transitioned to working in the public schools as a Teacher for the Deaf/Hard-of-Hearing and a Speech-Language Pathologist while continuing to see children privately. She obtained the rigorous Certification in Auditory-Verbal Therapy in 2004. She began pursuing her Doctoral degree in the fall of 2012 while continuing to work full-time and being actively involved in state parent support groups for families of children with hearing loss. Since 2013, she has been employed as the Auditory Therapist with the cochlear implant team at VCU Health System in the Department of Audiology. She has written several grants with her colleagues and started Camp T.A.L.K. (Talking and Listening Kids) for pediatric audiology patients at VCU. Camp T.A.L.K. is a one-week summer camp program for children

with hearing loss using oral communication approaches including parent education sessions in collaboration with VCU School of Education. The program grew from seven children with hearing loss the first year to over thirty children in the fourth year. She also teaches adjunct courses at the VCU School of Education including: (a) Collaboration and Universal Design for Learning; (b) Communication and Language for Early Childhood Educators; and (c) Trends in Special Education. She has been active in state legislative efforts to improve services across Virginia for children with hearing loss. In 2017, Alison began working with the World Pediatric Project and Sandy Lane Charitable Trust to provide professional development to Speech-Pathologists working with children who have cochlear implants in Barbados in addition to conducting evaluations for children with hearing loss on the island.