Communication and Language Intervention Series

Promoting Language and Literacy in Children who are Deaf or Hard of Hearing

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After many years of clinical work in rehabilitative audiology and early intervention, Dr. Mary Pat Moeller obtained a Ph.D. from the University of Nebraska at Lincoln. Her research interests include mother–child interaction, theory of mind development in children who are deaf or hard of hearing, and the study of factors influencing the outcomes of children who are hard of hearing. She directed a team at Boys Town National Research Hospital in the development of a web site for families whose infants are referred from newborn hearing screening (http://www.babyhearing.org; http://www.audiciondelbebe.org). She is coprincipal investigator of a National Institutes of Health–funded multisite study of the longitudinal outcomes of children who are hard of hearing. Dr. Moeller has published widely and has lectured internationally on topics related to early development in children who are deaf or hard of hearing.

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Promoting Language and Literacy Development in Children Who Are Deaf or Hard of Hearing

An Introduction

Mary Pat Moeller, David J. Ertmer, and Carol Stoel-Gammon

Children who are deaf or hard of hearing (D/HH) are adept learners with widely varied interests, talents, family backgrounds, hearing abilities, and specific needs. These diverse individual traits make the intervention process both challenging and engaging for service providers. One common and pressing need for children who are D/HH is that they have early and consistent access to rich language models in the environment. Access to linguistic input and communicative exchanges is known to be a critical factor that influences language development in children who hear (Hoff & Naigles, 2002; Hurtado, Marchman, & Fernald, 2008; Slobin, 1985) and is especially critical for children who are D/HH, who may experience reductions in quality and/or consistency of access to language exposure (Moeller & Tomblin, in press; Snow, 1994). Therefore, a central goal of interventions designed for children who are D/HH is the promotion of early and consistent communication access as a way of preventing or minimizing linguistic delays. Strategies for working toward these goals include the provision of 1) capacity-building supports for families, 2) linguistically rich environmental stimulation (either auditory, visual, or both), 3) well-fit and monitored hearing assistance technologies with focus on active promotion of auditory learning, and 4) effective early interventions that support families in implementing their chosen communication approach(es). The overall purpose of these strategies is to promote children's establishment of strong language foundations in the early years to support later literacy and social language competence.

A NEW GENERATION OF CHILDREN WHO ARE DEAF OR HARD OF HEARING

Since the early 2000s, intervention needs of children who are D/HH could be described as a moving target—the landscape has changed dramatically and continues to change due to advancements in early identification, technology, and early service innovations. For service providers, this situation makes some previously familiar landmarks less recognizable and some tried and true intervention methods less applicable. As a result of early identification and changing technologies, providers are faced with the need to expand their knowledge and skill sets, including preparation for working across a wider range of ages (infants through young adults) and the management of complex technologies (e.g., cochlear implants, digital hearing aids, frequency-modulation [FM] systems). Children are served by intervention programs at much earlier ages than in the past, and **early intervention** services commonly begin in the first year of life, which requires a skill set for working within the context of the family system. In general, the service delivery process has shifted from emphasis on remedial approaches for late-identified children to preventative developmental approaches for those who are identified early. Prior to universal newborn hearing screening (UNHS), infants who were D/HH were often identified late, and this was especially true for infants who were hard of hearing (HH), typically identified at 2 years of age or later (Halpin, Smith, Widen, & Chertoff, 2010; Stein, Clark, & Kraus, 1983; Stein, Jabaley, Spitz, Stoakley, & McGee, 1990). Fortunately, studies confirm that early hearing screening has been effective in decreasing age of identification as well as the ages at which children receive follow-up care, such as confirmatory testing, enrollment in early intervention, and fitting of amplification devices (Dalzell et al., 2000; Durieux-Smith, Fitzpatrick, & Whittingham, 2008; Harrison, Roush, & Wallace, 2003; Holte et al., 2012; Spivak, Sokol, Auerbach, & Gershkovich, 2009; Vohr et al., 2008). Although some children are still identified late in the era of UNHS (Walker et al., 2014), this unfortunate situation occurs far less often than in the past, which alters the characteristics and experiences of families and children in ways that positively influence the nature of presenting intervention needs.

When early identification is linked efficiently with follow-up steps, families are placed in a proactive position, with opportunities to provide early linguistic stimulation (either auditory, visual, or both) that may minimize or prevent communicative delays. When early intervention services are effective with children and families, child outcomes are typically better than in the past (see Spencer & Marschark, 2006, for a review), and this positive shift has cascading effects, altering abilities and intervention needs at later stages in children's development. To stay abreast of these advancements, service providers are challenged to gain new skills, understand the impact of children's perceptual abilities on learning, rely less on past experiences, and remain current as children's technology offers advanced features and opportunities. This situation presents a compelling rationale for developing a book focused on language and literacy interventions for children who are D/HH—as Bob Dylan crooned in the 1960s, "The times, they are a-changin'."

Although the landscape is shifting, the need for an **individualized approach to intervention** endures. Children who are D/HH represent a heterogeneous group with highly varied outcomes, unique strengths, and individualized needs. Even when we see average outcomes improving for this group, studies consistently report wide ranges in individual outcomes; some children thrive and others struggle. What works for one child does not necessarily work for another. This makes it incumbent on the service provider to critically evaluate children's responses to intervention and to alter strategies as needed to address individual needs. Recent advances allow many children who are D/HH to develop spoken language. However, varied approaches are required and desirable to address the diverse array of child and family needs, family communication choices, cultural values, and learning styles. It is recommended practice that service providers have the professional qualifications and core knowledge and skills to optimize child development and family well-being, "regardless of the route or routes taken by the family (e.g., spoken language, American Sign Language, visually-supported spoken language)" (Joint Committee on Infant Hearing [JCIH], 2013, p. e1328). Thus, for some children and families, the intervention process requires service providers that have highly specialized skills. For example, some interventions require fluency in American Sign Language (ASL), and some require specialized skills in early auditory development and management of cochlear implants.

Furthermore, it is estimated that 35%–40% of children who are D/HH are reported to have other conditions/disabilities (Gallaudet Research Institute, 2010; Yoshinaga-Itano, Sedey, Coulter, & Mehl, 1998), sometimes referred to as "D/HH plus." The high incidence of special needs in this group of children adds to the need for expertise in developmental, medical, and communicative (e.g., augmentative) strategies on the part of service providers. Several authors in this book share challenging and interesting case studies in order to reinforce the concept that service providers must use diagnostically oriented interventions, keen observation, and careful tracking of responses to intervention to guide the adaptive intervention process and bring about successful outcomes with children who have complex developmental needs.

PURPOSES OF THIS BOOK

A primary goal of this book is to describe and critically examine a broad range of intervention approaches that are specifically designed for and/or commonly used with children who are D/HH. Principles of **evidence-based practice** are incorporated into each chapter. The American Speech-Language-Hearing Association (2005) defines the term *evidence-based practice* (EBP) as "an approach in which current, *high-quality research evidence* is integrated with *practitioner expertise* and *client preferences and values* into the process of making clinical decisions." As part of these decision-making processes, service providers are expected to acquire and maintain knowledge and skills related to EBP to critically evaluate intervention approaches and the quality of evidence while incorporating new high-quality evidence into practice. Given these expectations, another key goal of this book is to support readers in gaining additional skills for critically examining intervention approaches and considering the evidence supporting them (or lack thereof). This is a tall order.

On a positive note, service innovations since the turn of the century have fueled opportunities for and interest in research on the outcomes of children who are D/HH. However, in some ways, technological progress has outpaced the garnering of evidence to support specific intervention approaches. We acknowledge at the outset that evidence supporting specific interventions for children who are D/HH is quite limited and, in some cases, only beginning to appear in literature. Comparative intervention studies are particularly rare. In spite of these constraints, efforts to purposefully integrate best available research evidence with practitioner expertise and client values and preferences are at the foundation of effective practice and are therefore endorsed and modeled throughout this text.

Children who are D/HH also benefit from many evidence-based interventions that were developed for children who hear. Thus, in the chapters that follow, authors describe widely implemented intervention approaches from the child language literature along with the evidence supporting them. When these approaches are implemented with children who are D/HH, they may require some specific adaptations that are based in service provider knowledge of the population and mastery of specialized skills. The authors have made every effort to describe their important insights regarding the process of adapting interventions and the unique skills that are required of the service provider.

Another purpose of this book is to provide comprehensive coverage of the diverse approaches that are typically implemented with children who are D/HH and their families. Some intervention practices for children who are D/HH are highly specialized and involve unique certifications or competencies (Listening and Spoken Language Specialist [LSLS]; bilingual-bicultural programs using American Sign Language). Other approaches adapt strategies that are designed for any child with speech-language challenges. Contributors to this book agree that a variety of strategies are often necessary, because it seems unlikely that a single approach will completely meet the wide array of auditory, visual, and communicative needs of the heterogeneous group of children who are D/HH. As editors, we have purposely recruited authors who present diverse intervention approaches that range on a continuum from primarily auditory focused to combined auditory-visual to primarily visually focused. We do so to promote understanding and evaluation of the specific interventions and to support the practice of individualization. The goal is not to polarize viewpoints but rather to present the varied strategies that are implemented singularly or in combination to support language development with this population. In reality, families may elect to use a variety of strategies and shift their emphasis based on the child's changing abilities. Many families of this new generation of children focus on the development of spoken language, yet others incorporate sign language within bilingual approaches. Some families elect to incorporate cued speech, manual codes of English, augmentative approaches, or a combination of strategies to serve as bridges to the development of spoken language. Selected authors share how the intervention process is adapted when auditory, visual, or combined approaches are implemented. Importantly, the chapter on family-centered practices (Chapter 4) discusses the concepts of informed choice and strategies for supporting families who are navigating the complexities of decision making around communication. Our overall goal is to promote a comprehensive understanding of the unique needs of children who

are D/HH along with contemporary practices that are designed to promote optimal outcomes.

ORGANIZATION OF THE BOOK

This book is organized into three main sections: Foundations of Intervention, Early Childhood Interventions, and Language and Literacy in the School Years. This organization reflects the developmental orientation of our work with children who are D/HH. These children may or may not present with persistent support needs throughout childhood, but regardless, their primary needs shift as linguistic skills develop and educational settings change. Intervention programs need to be developmentally appropriate, and there are distinct differences in the content focus of interventions for infants, preschoolers, and school-age children. Our overall organization respects how interventions change as children mature and service delivery settings shift (see Table 1.1).

Principles Guiding Individual Chapters

Several guiding principles (premises) influenced the selection of topics that are presented in the forthcoming chapters. These main premises are highlighted here as we orient the reader to the content that is emphasized in the individual chapters and sections.

Premise 1 Ongoing audiological management (Chapter 2) and provision of family supports (Chapter 3) are considered foundational to all service provision

Table 1.1. Developmental organization of topics covered in the book

Section	Settings/developmental stages	Primary intervention focus	Chapters
Foundations	Family, community, and school systems (birth–young adult)	Managing amplification needs	2
		Providing family support	3
Early childhood	Home based: on-site and distance via Internet (birth–3 years) Preschool and/or individual therapy (3–6 years) Home based, preschool, and individual settings (infant–school age)	Providing capacity-building interventions focused on early communicative development and family psychosocial support	4, 5, 6,
		Refining and strengthening auditory, visual, and linguistic foundations for learning	10
		Promoting early literacy and social pragmatic skills	7, 9
		Promoting ongoing development of phonology and conversational speech intelligibility	8
School age	School settings (6–18 years)	Promoting social cognitive skills that have an impact on literacy development	11
		Supporting reading and writing development	12, 13
		Promoting access to learning across the curriculum	14

for children who are D/HH and their families. Although some families may not elect amplification for their children, all families interface with audiological services, and the majority receive ongoing services related to monitoring of auditory thresholds, fitting and verification of amplification, and/or mapping of cochlear implants. It is essential that service providers for children who are D/HH master and apply audiological principles and work in partnership with the audiologist to optimize the child's reliance on and consistent use of devices. Recent evidence supports the practices of early device fitting and optimizing the child's auditory access (audibility). Longitudinal studies demonstrate that age of fitting/implantation (Nicholas & Geers, 2007; Sininger, Grimes, & Christensen, 2010) and the amount of audibility provided by hearing aids (Stiles, McGregor, & Bentler, 2012; Tomblin, Oleson, Ambrose, Walker, & Moeller, 2014) contribute to child outcomes. Recent evidence also suggests that consistency of device use improves during the preschool years but is most variable in toddlers, less-educated families, and children with hearing thresholds in the mild range (Walker et al., 2013). We began this chapter with an emphasis on access to linguistic input. For the majority of children using amplification devices, verified high-quality fittings (McCreery, Bentler, & Roush, 2013), optimal audibility, and consistent device use are our first line of defense in supporting linguistic access for children learning spoken language.

Effective family support is known to be an influential aspect of intervention (Calderon & Greenberg, 1999) that is valued by families both early (Global Coalition of Parents of Children Who Are D/HH, 2010) and throughout the course of the child's development. In a recent qualitative study, families of newly identified children reported gaps in Early Hearing Detection and Intervention systems in the areas of social services and parent support (Fitzpatrick, Angus, Durieux-Smith, Graham, & Coyle, 2008). Chapter 3 introduces multidisciplinary perspectives from social work on the topic of family support. The authors consider four theoretical models for understanding parental and family experiences when a child in the family is D/HH: 1) the grief model, 2) the family systems model, 3) the stress and coping model, and 4) the social construction model. Importantly, this chapter reviews the evidential basis for specific components of family support practices and considers family-defined notions of support. This chapter also addresses unique considerations for supporting families when the parents are D/HH. The importance of supporting and respecting family decision-making authority is discussed.

Premise 2 Family involvement in promoting communication access and language development is a strong contributor to child success. Chapters 4–10 focus on developmental interventions for infants and young children (birth to 6 years), including interventions that support family roles (i.e., coaching models) as primary models of language and facilitators of communicative development. The section begins with an orientation to family-centered practice principles (Chapter 4) that are considered recommended practice in early childhood special education (ECSE). Many evidence-based practices from ECSE are required by federal legislation funding early intervention services and are endorsed by policy groups working with families who have infants who are D/HH (Moeller, Carr, Seaver, Stredler-Brown, & Holzinger, 2013). However, some components

of intervention are unique to these families and require specialized areas of expertise. A model for building family capacity, including coaching them in the provision of an accessible, language-rich environment for the child, is described. The next two chapters explore the ways that coaching models are applied to promote auditory foundations for spoken language development in infancy (Chapter 5) and methods for coaching when sign language and/or other visual approaches are implemented (Chapter 6). These chapters include a discussion of specific interventions and strategies that are used to support families in the provision of a language-rich environment throughout daily routines to promote language development in infants and young children.

Premise 3 Children who are D/HH are educated in a variety of settings beginning at preschool, including child care and regular early childhood preschools. Interventions need to be tailored to these varied settings, and both individual and group interventions are designed to promote active learning, phonological development, social development, and literacy skills. Chapter 7 introduces the topic of auditory-based intervention approaches for preschoolers. This chapter describes the theoretical rationale and evidence supporting an auditory-first approach to the development of spoken language and literacy skills. This intervention approach focuses on the primacy of audition for the development of spoken language skills and is inclusive of auditory-oral and auditory-verbal methods. Through the provision of auditory access to rich and fluent conversational models, the emphasis is on natural language development with limited need for remedial interventions. Chapter 8 focuses on phonological development and interventions for children who are D/HH. This topic is particularly important given that recent studies suggest that phonological development, because of its dependence on the fidelity of the speech signal, may be vulnerable to delays in children who are D/HH (Moeller & Tomblin, in press; von Hapsburg & Davis, 2006). Thus, proactive developmental approaches are needed. Assessment strategies and evidence-based interventions that can be applied to meet habilitative and rehabilitative goals are described. This topic is addressed from a developmental viewpoint, beginning with vocal development in infancy and continuing through the stages to arrive at topics such as refinement of conversational speech intelligibility at the school-age level. Chapter 9 describes intervention delivered in the context of preschool settings and curricula. Following a discussion of the evidence promoting developmentally appropriate practices, this chapter demonstrates how auditory, language, and speech interventions are embedded in classroom routines. Methods for differentiating and accommodating individual child instructional needs are described.

Premise 4 Families also represent a "new generation," and they access information in new and technologically supported ways, which opens innovative avenues for service access/delivery. Chapter 10, the final chapter of the section on early childhood interventions, introduces a new frontier in intervention practices for children who are D/HH and their families—Internet therapy. Many families live far from qualified providers. Others may not have the means to access the specialized early intervention services they desire for their child. Modern telecommunication technology has the potential to overcome

long-standing obstacles to service access, is readily accessible, and can be cost effective, reducing travel and time commitments for families and service providers (Stredler-Brown, 2013). Access to services should no longer be dictated by where the child lives, the language of the home, or the type of services or communication approaches chosen. Chapter 10 reviews the technological applications, types of interventions that can be delivered at a distance, and the competencies required of service providers. Internet therapy delivered at a distance is another area in which technological improvements have outpaced the collection of evidence, but practitioner experiences and existing evidence are valuable in guiding both research and practice.

Premise 5 The promotion of optimal literacy outcomes has been an elusive goal in the history of programs designed for children who are D/HH. However, outcomes and strategies are also improving in these areas, and a fresh consideration of reading and written language interventions is needed. The third and final section of the book, on language and literacy in the school years (Chapters 11–14), discusses the promotion of language, social cognition, and literacy in school-age students along with strategies for supporting students across the curriculum. Chapter 11 focuses on building strong foundations for reading comprehension and social interaction. This chapter includes strategies to develop theory of mind abilities as a way to promote the comprehension of academic discourse and socialization. It is known that theory of mind is a developmentally vulnerable domain for children who are D/HH, suggesting the need to consider current intervention strategies to prevent delays. Chapter 12 presents evidence-based contemporary reading interventions for students who benefit from audition and for those children who do not. Chapter 13 describes a model of process writing, which is a broad approach to written language development that is grounded in a view of writing as a recursive process, in which text is used as a tool for communication and learning. Chapter 14 wraps up the school age section by considering the topic of educational advocacy for students who are D/HH. This chapter explores ways to implement a tiered service delivery model and how to link interventions to Common Core State Standards in school programs. Tools for assessing communication access and classroom listening are discussed. Finally, the afterword brings the text to a conclusion in the form of five broad considerations that guide current and future practices.

ORGANIZATION OF INDIVIDUAL CHAPTERS

The reader can expect to find parallel content areas across the chapters, although they may vary in specific organizational structure. Chapters include sections related to 1) reasons that selected intervention approaches are important for children who are D/HH (relevance); 2) the theoretical basis for the intervention approach(es); 3) the use of assessments to identify intervention priorities and to guide the intervention process; 4) discussion of intervention characteristics and strategies, evidence to support them, and adaptations to meet individual needs; 5) case studies illustrating the intervention process; and 6) future directions. Each chapter ends with suggested readings and learning activities to promote application of concepts.

ADDITIONAL CONSIDERATIONS

This book is written with several audiences in mind. We expect that the content may be useful for students in university programs who are studying the process of aural habilitation/rehabilitation and/or child language interventions. This may include those studying the disciplines of speech-language pathology and audiology and those preparing to be teachers of D/HH students. We expect that service providers from each of these respective disciplines may find this book germane to their work. Finally, we envision that university professors may incorporate this book in their coursework related to interventions with children who are D/HH.

Current recommended practices for several chapters are modeled on the accompanying DVD (see DVD symbols and specific callouts in the chapters). Video demonstrations are intended to expand the readers' understanding of the specific intervention approaches described in the text. Furthermore, the demonstrations can assist readers in evaluating the applicability of specific techniques for the children and families in their practice settings. We have made an effort to show a range of child abilities and ages as well as adaptive intervention methods to increase generalizability. The DVD demonstrations are taken from actual intervention sessions (recorded either in educational settings at Boys Town National Research Hospital or by having videographers travel to the authors' communities).

Finally, the reader may notice that authors use terms that differ from some typically encountered in the literature. Rather than the more commonly used term *hearing age,* we use a term that captures the duration of a child's experience with cochlear implants or amplification. The selected term, **robust hearing** (Ertmer & Inniger, 2009, p. 1581), refers to the amount of time that children have had auditory access to speech at conversational-intensity levels. Use of this term highlights the need to consider children's exposure to spoken language models when making comparisons with age peers and younger children who are typically developing. For example, the phonological abilities of a 3-year-old child who was fitted with a cochlear implant (CI) at 12 months (i.e., has 2 years of robust hearing) are likely to be delayed compared with those of typically developing age peers who have experienced robust hearing since birth (Ertmer, Kloiber, Jung, Kirleis, & Bradford, 2012). Conversely, the time courses for making gains in prelinguistic speech development and expressive vocabulary have been shown to be more rapid for children implanted before 36 months than for younger, typically developing infants. This phenomenon appears to be due to the relatively advanced cognitive, social, and motor maturity levels of children who are D/HH when they first begin to hear via well-fit sensory aids (Ertmer & Inniger, 2009; Ertmer, Jung, & Kloiber, 2013). A similar concept could be extended to children in ASL programs, conceptualized as the duration of robust visual language exposure.

In addition, we adopt terms that are considered acceptable to the majority of stakeholders (i.e., family members, professionals, members of the Deaf community). Thus, we avoid terms that connote "impairment" and consistently use person-first terminology—in other words, *children who are deaf or hard of hearing*. Because this text may be used by multiple professional disciplines (speech-language pathologists, teachers of children who are D/HH, audiologists,

early interventionists), we have elected to refer to the professionals as *service providers,* which we see as an inclusive term.

In summary, today's children who are D/HH have distinct advantages over those who were born before UNHS and improvements in hearing and visual technology. Indeed, their educational and vocational futures are bright. Yet early screening and technological advancements by themselves do not ensure the development of age-appropriate and adequate communication abilities. Readers of this text will find out how essential their efforts can be in helping children reach their communicative and academic potentials and become fully functioning citizens.