

Contents

Preface	xi
Acknowledgments	xiii

Part I. Audiological and Technological Foundations of Auditory Brain Development

1	Neurological Foundations of Listening and Talking: We Hear With the Brain	3
	Introduction	4
	Begin Conversations with the Critical Question: What Is the Family's Desired Outcome?	5
	Typical Infants: Listening and Language Development	5
	Auditory Neural Development	8
	New Context for the Word <i>Deaf</i>	12
	Hearing Versus Listening	13
	A Model of Hearing Loss: The Invisible Acoustic Filter Effect	13
	Putting It All Together in a Counseling Narrative: Think About Hearing Loss as a Doorway Problem	14
	Summary	15
	Next Steps: What Will It Take to Optimize the Probability of Attaining a Listening and Spoken Language Outcome	17
2	The Audiovestibular System	19
	The Nature of Sound	20
	Subconscious Function	20
	Signal Warning Function	21
	Spoken Communication Function	22
	Acoustics	22
	Audibility Versus Intelligibility of Speech	27
	The Ling 6-7 Sound Test: Acoustic Basis and Description	28
	Audiovestibular Structures	29
	Data Input Analogy	29
	Outer and Middle Ear	32
	Inner Ear to the Brain	32
	The Vestibular System: The Sensory Organs of Balance	33
3	Hearing and Hearing Loss in Infants and Children	35
	Introduction	36
	Classifications	36

Degree (Severity): Minimal to Profound	36
Timing: Congenital or Acquired	41
General Causes: Endogenous, Exogenous, or Multifactorial	42
Genetics, Syndromes, and Dysplasias	43
Connexin 26	43
Genetic Testing	43
Syndromes	44
Inner Ear Dysplasias	46
Medical Aspects of Hearing Loss	47
Conductive Pathologies and Hearing Loss	47
Sensorineural Pathologies and Hearing Loss	54
Mixed, Progressive, Functional, and Central Hearing Losses	61
Synergistic and Multifactorial Effects	63
Auditory Neuropathy Spectrum Disorder (ANSD)	64
Vestibular Issues	66
Summary	66
4 Diagnosing Hearing Loss	69
Introduction	70
Newborn Hearing Screening and EHDI Programs	70
Test Equipment and Test Environment	74
Audiologic Diagnostic Assessment of Infants and Children	75
Test Protocols	77
Pediatric Behavioral Tests: BOA, VRA, CPA, Speech	79
Perception Testing	
Electrophysiologic Tests: OAE, ABR/ASSR, and Immittance	85
The Audiogram	89
Configuration (Pattern) of Thresholds on the Audiogram	92
Formulating a Differential Diagnosis	95
Sensory Deprivation	95
Ambiguity of Hearing Loss	96
Measuring Distance Hearing	97
Summary	97
5 Hearing Aids, Cochlear Implants, and Remote Microphone (RM) Systems	105
Introduction	106
For Intervention, First Things First: Optimize Detection of the	107
Complete Acoustic Spectrum	
Listening and Learning Environments	107
Distance Hearing/Incidental Learning and S/N Ratio	107
ANSI/ASA S12.60-2010: Acoustical Guidelines for Classroom	109
Noise and Reverberation	
Talker and Listener Physical Positioning	111

Amplification for Infants and Children	112
Hearing Aids	112
Bone Anchored Implants for Children (Also Called Osseointegrated [Osseo] Implants) or Bone Conduction Hearing Devices	130
Wireless Connectivity	132
HATs for Infants and Children: Personal-Worn RM and Sound-Field FM and IR (Classroom Amplification) Systems	133
Cochlear Implants	144
Auditory Brainstem Implant (ABI)	154
Measuring Efficacy of Fitting and Use of Technology	155
Equipment Efficacy for the School System	155
Conclusion	158

Part II. Developmental, Family-Focused Instruction for Listening and Spoken Language Enrichment

6 Intervention Issues	161
Basic Premises	162
Differentiating Dimensions Among Intervention Programs	164
Challenges to the Process of Learning Spoken Language	167
Late to Full-Time Wearing of Appropriate Amplification or Cochlear Implant(s)	168
Disabilities in Addition to the Child's Hearing Loss	172
Ongoing, Persistent Noise in the Child's Learning Environment	173
Multilingual Environment	174
Educational Options for Children with Hearing Loss, Ages 3 to 6	175
7 Auditory "Work"	183
Introduction	184
The Primacy of Audition	184
The Acoustics-Speech Connection	186
Intensity/Loudness	186
Frequency/Pitch	188
Duration	189
The Effect of Hearing Loss on the Reception of Speech	190
A Historical Look at the Use of Residual Hearing	191
The Concept of <i>Listening Age</i>	192
Auditory Skills and Auditory Processing Models	195
Theory of Mind and Executive Functions	198
How to Help a Child Learn to Listen in Ordinary, Everyday Ways	201
Two Examples of Auditory Teaching and Learning	204
Scene I: Tony	204
Scene II: Tamara	208

Targets for Auditory/Linguistic Learning	210
A Last Word	211
8 Spoken Language Learning	213
Introduction	214
What's Involved in Talking?	214
Intentionality/Speech Acts	214
Presuppositional Knowledge	215
Discourse/Conversational Conventions	215
Other Essential Rule Systems in English	216
<i>How Does a Child Learn to Talk?</i>	218
Relevance for Intervention Decisions	220
How Should Intervention Be Organized?	221
9 Constructing Meaningful Communication	225
Introduction	226
The Affective Relationship	228
The Child's Development of Interactional Abilities	229
Joint Reference, or Joint Attention	230
Turn-Taking Conventions	231
Signaling of Intention	233
Characteristics of Caregiver Talk	234
1. Content: What Gets Talked About?	235
2. Prosody: What Does Motherese Sound Like?	236
3. Semantics and Syntax: What About Complexity?	237
4. Repetition: Say It or Play It Again	238
5. Negotiation of Meaning: Huh?	239
6. Participation-Elicitors: Let's (Keep) Talk(ing)	239
7. Responsiveness	240
Issues About Motherese	242
How Long Is Motherese Used?	242
Motherese: Why Do We Use It?	242
Motherese: Is It Immaterial or Facilitative?	243
10 Interacting in Ways That Promote Listening and Talking	245
Introduction	246
The Emotional Impact of a Child's Hearing Loss on the Family	247
Adult Learning	253
What Parents Need to Learn	255
Role of the LSL Practitioner	255
Components of Intervention for Babies and Young Children with Hearing Loss	256
When to Talk with Your Child and What to Talk About	257
A Framework for Maximizing Caregiver Effectiveness in Promoting Auditory/Linguistic Development in Children with Hearing Loss	259

Background and Rationale	259
Structure of the Framework	263
Getting a Representative Sample of Interacting	263
Discussing the Framework with Parents	264
Ways of Addressing Parent-Chosen Interactional Targets	265
Determining and Sequencing Targets Specific to the Child's Development of Auditory, Language, and Speech Development	267
Relationship Between Family and LSL Practitioner	268
Teaching Through Incidental and Embellished Interacting	268
Teaching Through Incidental Interacting	269
Embellishing an Incidental Interaction	270
Teaching Spoken Language Through Embellished Interacting	271
Teaching Listening (Audition) Through Embellished Interacting	274
Teaching Speech Through Embellished Interacting	275
Preplanned Parent Guidance Sessions or Auditory-Verbal Therapy/Instructional Sessions	279
Where Should the Auditory-Verbal Therapy (LSL)/Instructional Sessions Occur?	279
What Happens in an Auditory-Verbal Therapy/Instructional Session to Address Child Targets?	280
Components to Be Accomplished in a Typical Preplanned Session to Address Child Targets	280
Sample Preplanned Scenario	282
Substructure	285
About the Benefits and Limitations of Preplanned Teaching	285
What Does the Research Say?	286
Appendix 1: How to Grow Your Baby's or Child's Brain Through Daily Routines	289
Appendix 2: Application and Instructions for the Ling 6-7 Sound Test for Distance Hearing	291
Appendix 3: Targets for Auditory/Verbal Learning	293
Appendix 4: Explanation for Items on the Framework	307
Appendix 5: Checklist for Evaluating Preschool Group Settings for Children With Hearing Loss Who Are Learning Spoken Language	317
Appendix 6: Selected Resources	323
Appendix 7: Description and Practice of Listening and Spoken Language Specialists: LSLs Cert. AVT and LSLs Cert. AVEEd	329
Appendix 8: Principles of Certified LSL Specialists	331
Appendix 9: Knowledge and Competencies Needed by Listening and Spoken Language Specialists (LSLS)	333
Appendix 10: Listening and Spoken Language Domains Addressed in This Book	339