

GLOBAL
EDITION



Introduction to Communication Disorders

A Lifespan Evidence-Based Perspective

FIFTH EDITION

Robert E. Owens, Jr. • Kimberly A. Farinella • Dale Evan Metz



ALWAYS LEARNING

PEARSON

Introduction to Communication Disorders

A LIFESPAN EVIDENCE-BASED PERSPECTIVE

**GLOBAL
EDITION**

ROBERT E. OWENS, Jr.
College of St. Rose

KIMBERLY A. FARINELLA
Northern Arizona University

DALE EVAN METZ
State University of New York at Geneseo, Emeritus

PEARSON

Boston Columbus Indianapolis New York San Francisco Upper Saddle River
Amsterdam Cape Town Dubai London Madrid Milan Munich Paris Montreal Toronto
Delhi Mexico City Sao Paulo Sydney Hong Kong Seoul Singapore Taipei Tokyo

Vice President, Editorial Director: Jeffery W. Johnston
Executive Acquisitions Editor: Ann Davis
Executive Field Marketing Manager: Krista Clark
Senior Product Marketing Manager: Christopher Barry
Project Manager: Annette Joseph
Head of Learning Asset Acquisition, Global Edition:
Laura Dent
Acquisitions Editor, Global Edition: Sandhya Ghoshal

Assitant Project Editor, Global Edition: Sinjita Basu
**Senior Manufacturing Controller, Production,
Global Edition:** Trudy Kimber
Full-Service Project Management: Jouve India
Cover Designer: Lumina Datamatics
Cover Photo: Shutterstock/nchlsft
Cover Printer: Ashford Colour Press

Pearson Education Limited
Edinburgh Gate
Harlow
Essex CM20 2JE
England

and Associated Companies throughout the world

Visit us on the World Wide Web at:
www.pearsonglobaleditions.com

© Pearson Education Limited 2015

The rights of Robert E. Owens, Jr., Kimberly A. Farinella, and Dale Evan Metz to be identified as the authors of this work have been asserted by them in accordance with the Copyright, Designs and Patents Act 1988.

Authorized adaptation from the United States edition, entitled Introduction to Communication Disorders: A Lifespan Evidence-Based Perspective, 5th edition, ISBN 978-0-133-35203-0, by Robert E. Owens, Jr., Kimberly A. Farinella, and Dale Evan Metz, published by Pearson Education © 2015.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without either the prior written permission of the publisher or a license permitting restricted copying in the United Kingdom issued by the Copyright Licensing Agency Ltd, Saffron House, 6-10 Kirby Street, London EC1N 8TS.

All trademarks used herein are the property of their respective owners. The use of any trademark in this text does not vest in the author or publisher any trademark ownership rights in such trademarks, nor does the use of such trademarks imply any affiliation with or endorsement of this book by such owners.

ISBN 10: 1-292-05889-7
ISBN 13: 978-1-292-05889-4

British Library Cataloguing-in-Publication Data
A catalogue record for this book is available from the British Library

10 9 8 7 6 5 4 3 2 1
14 13 12 11 10

Typeset in ITC Mendoza Roman Std by Jouve India.

Printed in Great Britain By Ashford Colour Press Ltd, Gosport.

*Wendy Metz,
MS, CCC-SLP,
wife, colleague, mentor, and friend*

Introducing a new edition is always exciting and exhausting. In preparing a new edition, especially an introductory text, there is always the question of balance. Did we provide enough detail? Too much? Did we get the perspective correct? We hope that those of you who are familiar with the previous editions will agree with us that this edition is a worthy introduction to the field of speech pathology and audiology and one that contributes meaningfully to the education of speech-language pathologists and audiologists.

Within each chapter, we have attempted to describe a specific type of disorder and related assessment and intervention methods. In addition, we have included lifespan issues and evidence-based practice to provide the reader with added insights. Each type of disorder is illustrated by personal stories of individuals with that disorder. Further knowledge can be gained through the suggested readings provided at the conclusion of each chapter.

NEW TO THIS EDITION

This fifth edition of *Introduction to Communication Disorders* has many new features that strengthen the existing material in the previous edition. These include the following:

- Chapters have been reorganized and rewritten to help conceptualize the information differently so as to conform more to current clinical and educational categories. Several chapters have been reworked entirely.
- The reorganization of the entire book has resulted in fewer chapters—in part to respond to instructors’ concerns about covering the material in a semester. We do listen!
- Of course, the material in each chapter has been updated to reflect the current state of clinical research. Special attention has been paid to the growing body of evidence-based research and literature. A quick perusal of the references will verify the addition of hundreds of new professional articles.
- As in the past, we have worked to improve readability throughout the book and to provide the right mix of information for those getting their first taste of this field. Several professors and students have commented favorably on our attempt in previous editions to speak directly to the reader, and we have continued and expanded this practice.
- We have continued to provide evidence-based practices in concise, easy-to-read boxes within each chapter. This demonstrates our commitment to this practice begun in the previous edition. As with all the rest of the text, these boxes have been updated to reflect our best knowledge to date.
- Background information has been simplified and shortened, in response to input from professors who felt we had provided too much and that

this information would be covered in other introductory course in anatomy and physiology, language development, and phonetics. This change increases readability and decreases the burden on faculty who felt compelled to teach it all.

ACKNOWLEDGMENTS

Robert Owens

I would like to thank the faculty of the Department of Communication Sciences and Disorders and the entire faculty and administration at the College of St. Rose in Albany, New York. What a wonderful place to work and to call home. The college places a premium on scholarship, student education, professionalism, and a friendly and supportive workplace environment and recognizes the importance of our field. I am indebted to all for making my new academic home welcoming and comfortable. I am especially thankful to President Margaret “Maggie” Kirwin, Interim School of Education Dean Margaret McLane, my chair Jim Feeney, and my colleagues in my department, fellow faculty members Dave DeBonis, Colleen Karow, Megan Overby, Jack Pickering, Anne Rowley, Jessica Kisenwether, and Julia Unger, and fellow clinical faculty members Kim Lamparelli, Elizabeth Baird, Marisa Bryant, Wyndi Capeci, Sarah Coons, Elaine Galbraith, Julie Hart, Barbara Hoffman, Jackie Klein, Kate Lansing, Jessica Laurenzo, Melissa Spring, and Lynn Stephens. You have all made me feel welcomed and valued.

It is with some sadness that I remember my colleagues at my former institution, State University of New York at Geneseo and the demise of the Department of Communicative Disorders and Sciences due to a shortsighted college administration decision. These great folks include Rachel Beck, Irene Belyakov, Linda Deats, Brenda Fredereksen, Beverly Henke-Lofquist, Thomas House, Carol Ivsan, Cheryl Mackenzie, Doug MacKenzie, Dale Metz, Diane Scott, Gail Serventi, and Bob Whitehead. All of us are indebted to the chair Linda House, who helped us keep our dignity and our promise to students in the face of a terrible and demoralizing situation. Best to you all always.

I would be remiss if I did not acknowledge the continuing love and support I receive from Addie Haas. She was with us in the first and second editions and continues to be a source of inspiration.

Finally, my most personal thanks and love goes to my spouse and partner, who supported and encouraged me and truly makes my life fulfilling and happy. I’m looking forward to our life together.

Kimberly Farinella

I wish to sincerely thank Bob Owens, Dale Metz, and Steve Dragin for again including me on this new and exciting edition of the textbook. I remain perpetually in awe of the fact that I work with such brilliant people, and I’m truly grateful for the opportunity.

I would also like to thank the faculty, staff, and students in the Department of Communication Sciences and Disorders at Northern Arizona University for their help and support of this current edition of the textbook. I especially want

to thank my dear friend and colleague, Dr. Emi Isaki, for her contributions to the *Disorders of Swallowing* chapter, and also to our graduate assistants at NAU, Susan Williams and Sonia Mehta, for their photo contributions.

I want to thank my family, especially my parents, for their continued support of my career, and I want to express my gratitude to my significant other and future spouse, Tom Parker. I look forward to a long and happy life with you with plenty of skiing in the beautiful mountains of Flagstaff, Arizona!

The following reviewers offered many fine suggestions for improving the manuscript: Tausha Beardsley, Wayne State University; Wendy Bower, State University of New York at New Paltz; Louise Eitelberg, William Paterson University. Their efforts are sincerely acknowledged.

Pearson wishes to thank Dr. Gatha Sharma for her contribution to the Global Edition.

BRIEF CONTENTS

- CHAPTER 1** Communicative Disorders and Clinical Service 23
- CHAPTER 2** Communication: Means, Impairments, Intervention 37
- CHAPTER 3** The Biological Mechanism of Speech 63
- CHAPTER 4** Language Impairments in Children 79
- CHAPTER 5** Literacy Impairments: Assessment and Intervention 125
- CHAPTER 6** Language Impairments in Adults 159
- CHAPTER 7** Stuttered Speech 205
- CHAPTER 8** Voice and Resonance Disorders 225
- CHAPTER 9** Disorders of Articulation and Phonology 251
- CHAPTER 10** Motor Speech Disorders 281
- CHAPTER 11** Dysphagia 307
- CHAPTER 12** Audiology and Hearing Loss 331
David A. DeBonis, Ph.D.
- CHAPTER 13** Using Augmentative and Alternative Communication 377
James Feeney, Ph.D.
- APPENDIX** Professional Organizations 401

CHAPTER 1	Communicative Disorders and Clinical Service	23
	HELPING OTHERS TO HELP THEMSELVES 24	
	COMMUNICATION DISORDERS 24	
	THE PROFESSIONALS 25	
	Audiologists 25	
	Speech-Language Pathologists 27	
	Speech, Language, and Hearing Scientists 28	
	Professional Aides 30	
	Related Professions: A Team Approach 30	
	SERVICE THROUGH THE LIFESPAN 30	
	Evidence-Based Practice 32	
	COMMUNICATION DISORDERS IN HISTORICAL PERSPECTIVE 34	
	SUMMARY 35	
	SUGGESTED READINGS 36	
CHAPTER 2	Communication: Means, Impairments, Intervention	37
	HUMAN COMMUNICATION 38	
	The Social Animal 38	
	Means of Communication 38	
	COMMUNICATION THROUGH THE LIFESPAN 44	
	COMMUNICATION IMPAIRMENTS 47	
	Language Disorders 49	
	Speech Disorders 50	
	Hearing Disorders 51	
	Auditory Processing Disorders 52	
	How Common Are Communication Disorders? 52	
	DECIDING WHETHER THERE IS A PROBLEM 55	
	Defining the Problem 56	
	Assessment Goals 56	
	Assessment Procedures 57	
	INTERVENTION WITH COMMUNICATION DISORDERS 59	
	Objectives of Intervention 59	
	Target Selection 59	
	Baseline Data 60	

Behavioral Objectives 60
 Clinical Elements 60
 Measuring Effectiveness 61
 Follow-up and Maintenance 61

SUMMARY 62

SUGGESTED READINGS 62

CHAPTER 3 The Biological Mechanism of Speech 63

THE PHYSIOLOGICAL SUBSYSTEMS SUPPORTING SPEECH 64

The Respiratory System 64
 The Phonatory System 69
 The Vocal Folds 69
 The Articulatory/Resonating System 71

THE SPEECH PRODUCTION PROCESS 75

SUMMARY 77

SUGGESTED READINGS 78

CHAPTER 4 Language Impairments in Children 79

LANGUAGE DEVELOPMENT THROUGH THE LIFESPAN 82

Pre-Language 82
 Toddler Language 84
 Preschool Language 85
 School-Age and Adolescent Language 88

ASSOCIATED DISORDERS AND RELATED CAUSES 90

Intellectual Disability 92
 Learning Disabilities 94
 Specific Language Impairment 97
 Autism Spectrum Disorder (ASD) 100
 Brain Injury 104
 Neglect and Abuse 105
 Fetal Alcohol Syndrome and Drug-Exposed Children 106
 Other Language Impairments 107
 Conclusion 107

ASPECTS OF LANGUAGE AFFECTED 108

ASSESSMENT 108

Bilingual Children, English Language Learners, and Dialectal Speakers 110
 Referral and Screening 110
 Case History and Interview 111

Observation 111

Testing 111

Sampling 114

INTERVENTION 116

Target Selection and Sequence of Training 117

Evidence-Based Intervention Principles 117

Intervention Procedures 117

Intervention through the Lifespan 121

SUMMARY 123

SUGGESTED READINGS 123

CHAPTER 5 Literacy Impairments: Assessment and Intervention 125

READING 128

Phonological Awareness 128

Morphological Awareness 129

Comprehension 130

Reading Development through the Lifespan 130

Reading Problems through the Lifespan 133

Assessment of Developmental Reading 137

Intervention for Developmental Reading Impairment 140

WRITING 146

Spelling 147

Writing Development through the Lifespan 147

Writing Problems through the Lifespan 149

Assessment of Developmental Writing 151

Intervention for Developmental Writing Impairment 152

SUMMARY 158

SUGGESTED READINGS 158

CHAPTER 6 Language Impairments in Adults 159

LANGUAGE DEVELOPMENT THROUGH THE LIFESPAN 161

Use 161

Content 162

Form 162

THE NERVOUS SYSTEM 162

Central Nervous System 163

APHASIA 165

Concomitant or Accompanying Deficits 168

Types of Aphasia 170

Causes of Aphasia 174
 Lifespan Issues 176
 Assessment for Aphasia 178
 Intervention 181
 Evidence-Based Practice 184
 Conclusion 185

RIGHT HEMISPHERE BRAIN DAMAGE 186

Characteristics 186
 Assessment 189
 Intervention 189

TRAUMATIC BRAIN INJURY (TBI) 191

Characteristics 192
 Lifespan Issues 193
 Assessment 195
 Intervention 195

DEMENTIA 197

Alzheimer's Disease 198

SUMMARY 202

SUGGESTED READINGS 203

CHAPTER 7 Stuttered Speech

205

FLUENT SPEECH VS. STUTTERING 208

Normal Disfluencies 208
 Stuttered Disfluencies 208

THE ONSET AND DEVELOPMENT OF STUTTERING THROUGH THE LIFESPAN 210

THE EFFECTS OF STUTTERING THROUGH THE LIFESPAN 212

THEORIES AND CONCEPTUALIZATIONS OF STUTTERING 214

Organic Theory 214
 Behavioral Theory 215
 Psychological Theory 215
 Current Conceptual Models of Stuttering 215

THERAPEUTIC TECHNIQUES USED WITH YOUNG CHILDREN 216

The Evaluation of Stuttering 216
 Indirect and Direct Stuttering Intervention 218

THERAPEUTIC TECHNIQUES USED WITH OLDER CHILDREN AND ADULTS WHO STUTTER 219

Fluency-Shaping Techniques 219
 Stuttering Modification Techniques 221
 Selecting Intervention Techniques 222

THE EFFECTIVENESS OF STUTTERING INTERVENTION THROUGH THE LIFESPAN 222

Efficacy of Intervention with Preschool-Age Children 222

Efficacy of Intervention with School-Age Children 223

Efficacy of Intervention with Adolescents and Adults 224

SUMMARY 224

SUGGESTED READINGS 224

CHAPTER 8 Voice and Resonance Disorders

225

NORMAL VOICE AND RESONANCE PRODUCTION 226

Vocal Pitch 226

Vocal Loudness 227

Resonance 228

VOICE DISORDERS 228

Disorders of Vocal Pitch 229

Disorders of Vocal Loudness 229

Disorders of Vocal Quality 229

Nonphonatory Vocal Disorders 230

Voice Disorders Associated with Vocal Misuse or Abuse 231

Voice Disorders Associated with Medical or

Physical Conditions 235

Voice Disorders Associated with Hypoadduction 235

Voice Disorders Associated with Hyperadduction 236

Other Conditions That Affect Voice Production 236

Voice Disorders Associated with Psychological or

Stress Conditions 238

RESONANCE DISORDERS 238

EVALUATION AND MANAGEMENT OF VOICE AND RESONANCE DISORDERS 239

The Voice Evaluation 239

The Resonance Evaluation 240

Intervention for Voice Disorders Associated with Vocal Misuse or Abuse 242

Intervention for Voice Disorders Associated with Medical or Physical Conditions 242

Intervention for Voice Disorders Associated with Psychological or Stress Conditions 243

Elective Voice Intervention for Transgender/Transsexual Clients 243

Treatment of Resonance Disorders 244

Efficacy of Voice and Resonance Treatment 246

SUMMARY 248

SUGGESTED READINGS 249

CHAPTER 9 Disorders of Articulation and Phonology 251

UNDERSTANDING SPEECH SOUNDS 253

- Classification of Consonants by Place and Manner 253
- Classification of Vowels by Tongue and Lip Position and Tension 254
- Distinctive Feature Analysis 255

SPEECH-SOUND DEVELOPMENT THROUGH THE LIFESPAN 255

- Pre-Speech 255
- Toddler Speech 258
- Preschool Speech 259
- School-Age Speech 260
- Phonology and Articulation 260

ASSOCIATED DISORDERS AND RELATED CAUSES 261

- Developmental Impairment in Children 261
- Language Impairments 262
- Hearing Impairments 263
- Neuromuscular Disorders 264
- Childhood Apraxia of Speech 265
- Structural Functional Abnormalities 266

LANGUAGE AND DIALECTAL VARIATIONS 266

- Characteristics of Articulation and Phonology 268
- Lifespan Issues 268
- Assessment 268
- Description of Phonological and Articulatory Status 268
- Prognostic Indicators 271
- Consistency 271
- Stimulability 272

INTERVENTION 273

- Target Selection 273
- Intervention Approaches 273
- Treatment of Neurologically Based Motor-Speech Disorders 277
- Generalization and Maintenance 278

SUMMARY 278**SUGGESTED READINGS 278**

CHAPTER 10 Motor Speech Disorders 281

MOTOR SPEECH CONTROL 282

- Structures of the Brain Important for Motor Speech Function 282
- Motor Speech Production Process 285
- Cranial Nerves Important for Speech Production 285

MOTOR SPEECH DISORDERS 285

Dysarthria 285

Apraxia of Speech 292

ETIOLOGIES OF MOTOR SPEECH DISORDERS 295

Cerebral Palsy 295

EVALUATION OF MOTOR SPEECH DISORDERS 300**TREATMENT OF MOTOR SPEECH DISORDERS 301**

Management of Dysarthria 301

Management of Acquired Apraxia of Speech 303

SUMMARY 304**SUGGESTED READINGS 305****CHAPTER 11 Dysphagia****307****LIFESPAN PERSPECTIVES 309****THE SWALLOWING PROCESS 310**

Oral Preparation Phase 310

Oral Phase 310

Pharyngeal Phase 310

Esophageal Phase 310

DISORDERED SWALLOWING 311

Oral Preparation/Oral Phase 311

Pharyngeal Phase 311

Esophageal Phase 311

Pediatric Dysphagia 311

Dysphagia in Adults 313

EVALUATION FOR SWALLOWING 316

Screening for Dysphagia in Newborns and the Elderly 316

Case History and Background Information

Regarding Dysphagia 317

Clinical Assessment 318

Cognitive and Communicative Functioning 318

Instrumentation 321

DYSPHAGIA INTERVENTION AND TREATMENT 323

Feeding Environment 323

Body and Head Positioning 323

Modification of Foods and Beverages 324

Behavioral Swallowing Treatments 325

Medical and Pharmacological Approaches 327

PROGNOSES AND OUTCOMES FOR SWALLOWING DISORDERS 328

SUMMARY 330

SUGGESTED READINGS 330

CHAPTER 12 Audiology and Hearing Loss 331
David A. DeBonis, Ph.D.

INCIDENCE AND PREVALENCE OF HEARING LOSS 332

Classification of Impairment, Disability, and Handicap 333

Deafness, the Deaf Community, and Deaf Culture 333

WHAT IS AUDIOLOGY? 334

Educational Requirements and Employment for Audiologists 335

FUNDAMENTALS OF SOUND 335

ANATOMY AND PHYSIOLOGY OF THE AUDITORY SYSTEM 336

The Outer Ear 336

The Middle Ear 337

The Inner Ear 338

The Central Auditory System 339

TYPES OF HEARING LOSS AND AUDITORY DISORDERS 340

Conductive Hearing Loss 340

Sensorineural Hearing Loss 342

Mixed Hearing Loss 346

(Central) Auditory Processing Disorders 346

HEARING LOSS THROUGH THE LIFESPAN 348

AUDIOLOGICAL ASSESSMENT PROCEDURES 350

Referral and Case History 351

Otoscopic Examination 352

Electroacoustic and Electrophysiological Testing 352

Behavioral Testing 354

AURAL (AUDIOLOGICAL) HABILITATION/REHABILITATION 363

Counseling 364

Amplification 365

Hearing Assistive Technology/Assistive Listening Devices 368

Auditory Training and Auditory Communication Modality 370

Visual Communication Modality 372

Treatment and Management of (Central) Auditory Processing Disorders 373

SUMMARY 374

SUGGESTED READINGS 375

CHAPTER 13 Using Augmentative and Alternative Communication 377
James Feeney, Ph.D.

Who Uses AAC? 379

TYPES OF AAC 379

Unaided AAC: Gestures and Vocalizations 380

Unaided AAC: Manual Sign Systems 380

Aided AAC 382

Aided Symbols: Tangible Symbols 382

Aided Symbols: Pictorial Symbols 383

Aided Symbols: Orthography and Orthographic Symbols 384

Combinations of Aided and Unaided Systems 384

ACCESS 384

OUTPUT 386

ASSESSMENT CONSIDERATIONS 388

Specific Assessment Considerations 390

AAC System Selection or Feature Matching 392

AAC Symbol Selection 392

AAC Vocabulary Selection 393

INTERVENTION CONSIDERATIONS 393

Evidence-Based Practice (EBP) in AAC 397

SUMMARY 399

SUGGESTED READINGS 400

APPENDIX Professional Organizations 401

Glossary 405

References 417

Name Index 447

Subject Index 457

Introduction to Communication Disorders

1

Communicative Disorders and Clinical Service

CHAPTER LEARNING GOALS

When you have finished this chapter, you should be able to:

- Describe communication impairment
- Describe the roles of audiologists, speech-language pathologists, and speech, language, and hearing scientists
- Outline the history of changing attitudes toward individuals with disabilities over the centuries and legislation over the past several decades
- Describe how evidence-based practice (EBP) influences clinical decisions





Can you imagine life without communication? No talking, no listening, no interacting with others? Communication is part of what makes us human. Even minor or temporary problems with communication, such as laryngitis, are often frustrating. Many of us have experienced a problem in speaking or listening at some time in our lives.

We hope through this text to explore the nature of **communication disorders**. In this first chapter, we'll introduce the professionals who work with individuals who have communication disorders. These are audiologists, speech-language pathologists, or speech/language scientists. We'll also explore the roles of other professional team members, where speech-language pathologists and audiologists work, and what they do, plus we'll explain the nature of EBP. This first chapter also provides a historical perspective and outlines the laws that mandate appropriate care for those in need. Along the way, we'll explore why people choose these careers.

HELPING OTHERS TO HELP THEMSELVES

Why does someone decide to become a speech-language pathologist (SLP) or audiologist? It is mostly because of the satisfaction they receive from helping others to live a fuller life. Many—maybe even you—first became interested through a personal or family encounter with a communication disorder or through a work or volunteer experience with individuals with communication disorders. SLPs and audiologists may also have chosen their careers because they want to be useful to society, to contribute to the general good.

COMMUNICATION DISORDERS

We've mentioned communication disorders, but we haven't been very specific. It's always good to agree on our topic in any type of communication, so let's begin here.

A **communication disorder** impairs the ability to both receive and send, and also process and comprehend concepts or verbal, nonverbal and graphic information. A communication disorder may affect hearing, language, and/or speech processes; may range from mild to profound severity; and may be developmental or acquired. One or a combination of communication disorders may be presented by an individual and may result in a primary disability or may be secondary to other disabilities.

That's a lot. In short, a communication disorder may affect any and all aspects of communication, even gesturing. A communication disorder may affect hearing, language (the code we use to communicate), and/or speech (our primary mode or manner of communication). This is reflected in American Speech Language Hearing Association's (ASHA) name. (The Appendix describes ASHA's role in more detail.) But communication impairments can affect much more as you are about to explore through this book and the course you're taking. For example, SLPs are also involved in feeding and swallowing assessment and intervention.

A **speech disorder** may be evident in the atypical production of speech sounds, interruption in the flow of speaking, or abnormal production and/or

absences of voice quality, including pitch, loudness, resonance, and/or duration. A **language disorder**, in contrast, is an impairment in comprehension and/or use of spoken, written, and/or other symbol systems. Finally, a **hearing disorder** is a result of impaired sensitivity of the auditory or hearing system. No doubt you've heard individuals referred to as deaf or hard of hearing. In addition, auditory impairment may include **central auditory processing disorders**, or deficits in the processing of information from audible signals.

It's appropriate to note here that communication disorders do not include communication difference, such as dialectal differences or multilingualism. If you've been to a country where you don't speak the language well, you know that this can impede communication. While these differences may lead to communication difficulties, they are not disorders.

Another communication variation is **augmentative/alternative communication** systems. Far from being communication impairments, these systems, whether signing or the use of digital methods, are attempts often taught by SLPs to compensate and facilitate, on a temporary or permanent basis, for impaired or disabled communication disorders.

As you can see, communication disorders cover a wide range of problems with varying severities and are related to several other disorders. Our purpose in preparing this text is to help you understand and appreciate the many different disorders included in communication impairment. Maybe you began a few pages ago with some vague recollection of an SLP in your elementary school who mostly worked with children correcting their production of difficult speech sounds. That's part of disordered communication, but it's only a small part, as you are about to find out.

THE PROFESSIONALS

Today, professionals who serve individuals with communication disorders come from several disciplines. They often refer clients to one another or work together in teams to provide optimal care. Specialists in communication disorders are employed in early intervention programs, preschools, schools, colleges and universities, hospitals, independent clinics, nursing care facilities, research laboratories, and home-based programs. Many are in private practice. SLPs and audiologists receive similar basic training, but in their advanced study, they concentrate on one profession or the other.

Opportunities for SLPs and audiologists include serving individuals of all ages from infancy through the aged with varied disorders, from mild to profound, in a wide assortment of settings.

Audiologists

Audiologists are specialists who measure hearing ability and identify, assess, manage, and prevent disorders of hearing and balance. They use a variety of technologies to measure and appraise hearing in people from infancy through old age. Although they work in educational settings to improve communication and programming for people with hearing disabilities, audiologists also contribute to the prevention of hearing loss by recommending and fitting protective devices and by consulting with government and industry on the effects and management of environmental noise. In addition, audiologists evaluate and assist individuals with **auditory processing disorders (APD)**, sometimes

called central auditory processing disorders, and select, fit, and dispense hearing aids and other amplification devices and provide guidance in their care and use (DeBonis & Moncrieff, 2008). Licensed audiologists are independent professionals who practice without a prescription from any other health care provider (ASHA, 2001b). Box 1.1 contains an audiologist's comments on some of the challenges and rewards of the profession. As you will note, being a good detective, or problem solver, is one of the skills that is needed. Websites of interest are found at the end of the chapter.

Credentials for Audiologists

At the present time, the educational requirement for an audiologist is 3 to 5 years of professional education beyond the bachelor's degree. An audiologist's studies will culminate in a doctoral degree that may be an audiology doctorate (AuD) or a doctor of philosophy degree (PhD) or doctor of education degree (EdD) in audiology.

After a person has earned a doctorate, obtained the required preprofessional as well as paid clinical experience, and passed a national examination, she or he is eligible for the Certificate of Clinical Competence in Audiology (CCC-A) awarded by ASHA. ASHA CCC-A (sometimes referred to as ASHA "Cs") is the generally accepted standard for most employment opportunities for audiologists in the United States. In addition, states require audiologists to obtain a state license. The requirements for state licensure tend to be the same as or similar to the ASHA standards (ASHA, 2001b, 2001c).

You can further explore a career in audiology at three websites. The Acoustical Society of America (<http://asa.aip.org>) has material of special interest to hearing scientists and audiologists. The American Academy of Audiology (www.audiology.org) provides consumer and professional information regarding hearing and balance disorders as well as audiological services. Finally, ASHA (www.asha.org) provides information for professionals, students, and others who are interested in careers in audiology or hearing science. Simply click on "Careers" in the upper-left corner.

BOX 1.1 | An Audiologist Reflects

I chose to become an audiologist because I enjoyed the challenge. Most clients come in and are frightened or apprehensive. I try to set them at ease while I explain each test I will perform. At each step, I try to bring the client along and make sure that he or she understands what I will be doing and why. Children are often the biggest challenge and sometimes refuse to cooperate. This is when I have to be at my best. If I confirm the presence of a hearing loss, then my task becomes one of counseling and referral. It takes time to walk a client

through the results and the possibilities. Older clients are often not willing initially to accept a diagnosis of hearing loss. Counseling is very important, especially for family members. It is all too easy for family members to adopt an "I told you so" attitude, but we must be sensitive to the needs of the client with the loss who will need time to adjust to his or her now-diagnosed disorder. It is this detective work and the counseling that give me satisfaction and motivate me to come to work every day.

Speech-Language Pathologists

Speech-language pathologists (SLPs) are professionals who provide an assortment of services related to communicative disorders. The distinguishing role of an SLP is to identify, assess, treat, and prevent communication disorders in all modalities (including spoken, written, pictorial, and manual), both receptively and expressively. This includes attention to physiological, cognitive, and social aspects of communication. SLPs also provide services for disorders of swallowing and may work with individuals who choose to modify a regional or foreign dialect. Like audiologists, licensed SLPs are independent professionals who practice without a prescription from any other health care provider (ASHA, 2000a, 2000b, 2000c). Box 1.2 contains reflections by two SLPs; the first one has been in private practice as a clinician for about 25 years. Although sometimes frustrated by the lack of support in his work setting, he believes in setting his imagination free and not giving up in the challenge to help others.

Credentials for Speech-Language Pathologists

With technology, the task of an SLP is changing. Technologies for digital speech recording and analysis are now readily available, as are new and exciting assistive technologies for those with great difficulty communicating via speech (Ingram et al., 2004). SLPs have a master's or doctoral degree and have studied typical communication and swallowing development; anatomy and physiology of the speech, swallowing, and hearing mechanisms; phonetics; speech and hearing science; and disorders of speech, language, and swallowing.

Three types of credentials are available for SLPs:

1. Public school certification normally stipulates basic and advanced coursework, clinical practice within a school setting, and a satisfactory score on a state or national examination. At the least, prospective school SLPs need a bachelor's degree, although in most states, a master's degree either is the entry-level requirement or is mandated after a certain number of years of

BOX 1.2 | A Speech-Language Pathologist Reflects

For me, the exciting part of my job is the problem solving and the satisfaction of helping others. Similar to a fictional detective who collects all the clues, synthesizes the information, and deduces the guilty party, I evaluate each client and determine the best course of intervention. The more severe the impairment, the greater the challenge, and I love a challenge. How can I help a young man who attempted suicide and is now brain injured to access the language within him? How can a young child with autism begin the road through communication to

language? How can I help parents communicate with their infant who has deafness, blindness, and cerebral palsy? When is the best time to introduce signing with a nonspeaking client? These are all challenges for me and the children and adults I serve. We work together as I try to solve each communication puzzle and propose and implement possible intervention strategies. Sometimes I'm very successful and sometimes I have to reevaluate my methods, but as I said, I love a challenge.

employment. The exact requirements to become a school SLP vary from state to state. ASHA encourages the same standards for SLPs in all employment settings, as described in the following paragraph.

2. ASHA issues a Certificate of Clinical Competence in Speech-Language Pathology (CCC-SLP) to an individual who has obtained a master's degree or doctorate in the field. Ongoing professional development must be demonstrated through a variety of continuing education options. Since 2004, the United States, United Kingdom, Australia, and Canada have allowed mutual recognition of certification in speech-language pathology (Boswell, 2004).
3. Individual states have licensure laws for SLPs that are usually independent of the state's department of education school certification requirements. A license is needed if you plan to engage in private practice or work in a hospital, clinic, or other setting apart from a public school. Most states accept a person with ASHA CCC-SLP as having met licensure requirements, although you will need to check with your state licensing board on the specifics.

Table 1.1 shows the credentials that are needed in the professions of audiology and speech-language pathology. These are also found on the ASHA website.

If you want to further explore a career in speech-language pathology, check out the ASHA website (www.asha.org). You'll find a wealth of information, as well as discussion of various disorders that affect children and adults who may benefit from the help of a SLP. Type in the disorder you wish to explore in the search box in the upper right. If you wish to read about a career as a SLP, click on "Careers" at the top left.



Thought Question

Speech, Language, and Hearing Scientists

Individuals who are employed as speech, language, or hearing scientists typically have earned a doctorate degree, either a PhD or an EdD. They are employed by universities, government agencies, industry, and research centers to extend our knowledge of human communication processes and disorders. Some may also serve as clinical SLPs or audiologists.



Click here to check your understanding of the concepts in this section.

TABLE 1.1

Credentials for speech-language pathologists and audiologists

Credentialing Organization	Speech-Language Pathologist	Audiologist
American Speech-Language-Hearing Association	Certificate of Clinical Competence in Speech-Language Pathology (CCC-SLP)	Certificate of Clinical Competence in Audiology (CCC-A)
State department of education	Certification as teacher of students with speech and language disabilities*	—
State professional licensing board	License as speech-language pathologist	License as audiologist

*The title for the school-based speech-language pathologist varies from state to state.

What Speech, Language, and Hearing Scientists Do

Speech scientists may be involved in basic research exploring the anatomy, physiology, and physics of speech-sound production. Using various technologies, these researchers strive to learn more about typical and pathological communication. Their findings help clinicians improve service to clients with speech disorders. Recent advances in knowledge of human genetics provide fertile soil for continuing investigation into the causes, prevention, and treatment of various speech impairments. Some speech scientists are involved in the development of computer-generated speech that may be used in telephone answering systems, substitute voices for individuals who are unable to speak, and many new purposes. Box 1.3 contains some observations by a speech-language scientist who enjoys the interdisciplinary nature of his work.

Language scientists may investigate the ways in which children learn their native tongue. They may study the differences and similarities of different languages. Over the past half a century or so, the United States has become increasingly linguistically and culturally diverse; this provides an excellent opportunity for cross-cultural study of language and communication. Some language scientists explore the variations of modern-day English (dialects) and how the language is changing. Others are concerned with language disabilities and study the nature of language disorders in children and adults. An in-depth knowledge of typical language is critical to understanding language problems.

Hearing scientists investigate the nature of sound, noise, and hearing. They may work with other scientists in the development of equipment to be used in the assessment of hearing. They are also involved in the development of techniques for testing the hard-to-test, such as infants and those with severe physical or psychological impairments. Hearing scientists develop and improve assistive listening devices such as hearing aids and telephone amplifiers to help people who have limited hearing. In addition, hearing scientists are concerned with conservation of hearing and are engaged in research to measure and limit the impact of environmental noise.

It's never too early to think about graduate school. Whether you eventually choose to become an audiologist, an SLP, or a speech, language, or hearing scientist, you will need advanced training. Consider cost, location, faculty, and practicum opportunities. Two websites can be helpful. The ASHA site (www.asha.org)

The professions of speech-language pathology and audiology require lifelong learning. Clinicians need to be able to intelligently use relevant research findings in their practice.



Thought Question

BOX 1.3 | A Speech-Language Scientist Reflects

I work as a speech scientist and college professor specializing in voice science. In this profession I'm able to combine my love of communication with my interest in biology. As a student I hadn't realized the possibilities that would be open to me in this profession. I instruct students in the structure and functioning of the speech mechanism and in voice disorders. In the clinic, I use instrumentation to

measure different parameters of voice. This enables me to objectify my diagnosis and provide accurate measurement of speech changes that may result from any number of disorders as varied as laryngeal cancer and neuromuscular dysfunction. I also work with transgender clients, helping them adopt a new voice. I love my work because it combines science and technology with speech-language pathology.

lists graduate program. Click on “Careers” to explore further. The Peterson’s Guide site (www.petersons.com) can assist you with helpful advice about graduate school and a student planner. Type “speech-language pathology,” “audiology,” or “speech, language or hearing science” in the *Find the School That’s Right for You* box at the upper right.

Professional Aides

Paraprofessionals usually have an associate’s or bachelor’s degree; they work closely with and are supervised by professionals with more training and experience.

Professional aides, sometimes referred to as paraprofessionals or speech-language pathology or audiology assistants, are individuals who work closely with SLPs or audiologists. In states in which professional aides are permitted, the title, educational requirements, and responsibilities of these individuals vary.

Speech-language pathology assistants (SLPAs) typically participate in routine therapy tasks, under the direction of an SLP. They may engage in clerical tasks and assist an SLP in the preparation of assessment and treatment materials. SLPAs may work alongside SLPs in many of the settings in which a fully credentialed SLP is found. Audiology assistants may conduct screenings, participate in calibration of audiological instrumentation, and engage in a variety of clerical tasks under the direction of an audiologist.

Support personnel may work only with supervision and are not permitted to perform such tasks as interpretation of test results, service plan development, family/client counseling, or determination of when to discharge a client from treatment (ASHA, 1995; Paul-Brown & Goldberg, 2001).

Related Professions: A Team Approach

Specialists in communication disorders do not operate in a vacuum. They work closely with family members, regular and special educators, psychologists, social workers, doctors and other medical personnel, and occupational, physical, and music therapists. They may collaborate with physicists and engineers. Box 1.4 contains a SLP’s schedule, showing a tremendous amount of teamwork.

SERVICE THROUGH THE LIFESPAN

Individuals with communication and swallowing disorders may be of any age, and professionals address their needs from birth through old age. According to U.S. Census Bureau reports, 1 in 5 people has a disability. In general, the likelihood of having a disability increases as we age. Unfortunately, the total number of individuals in the United States who have speech, voice, and swallowing and/or language disorders is difficult to determine (ASHA, 2008).

Infants may be screened for hearing loss and a host of other disabilities soon after birth. The U.S. Census Bureau reports that about 2% of all children born in the United States have some existing disabling condition and that hearing loss occurs more often than any other physical problem (Brault, 2005). Babies and toddlers may exhibit developmental delay and have physical problems including those involving movement, hearing, and vision that may impact their communication and feeding abilities. All infants in the United States must be screened