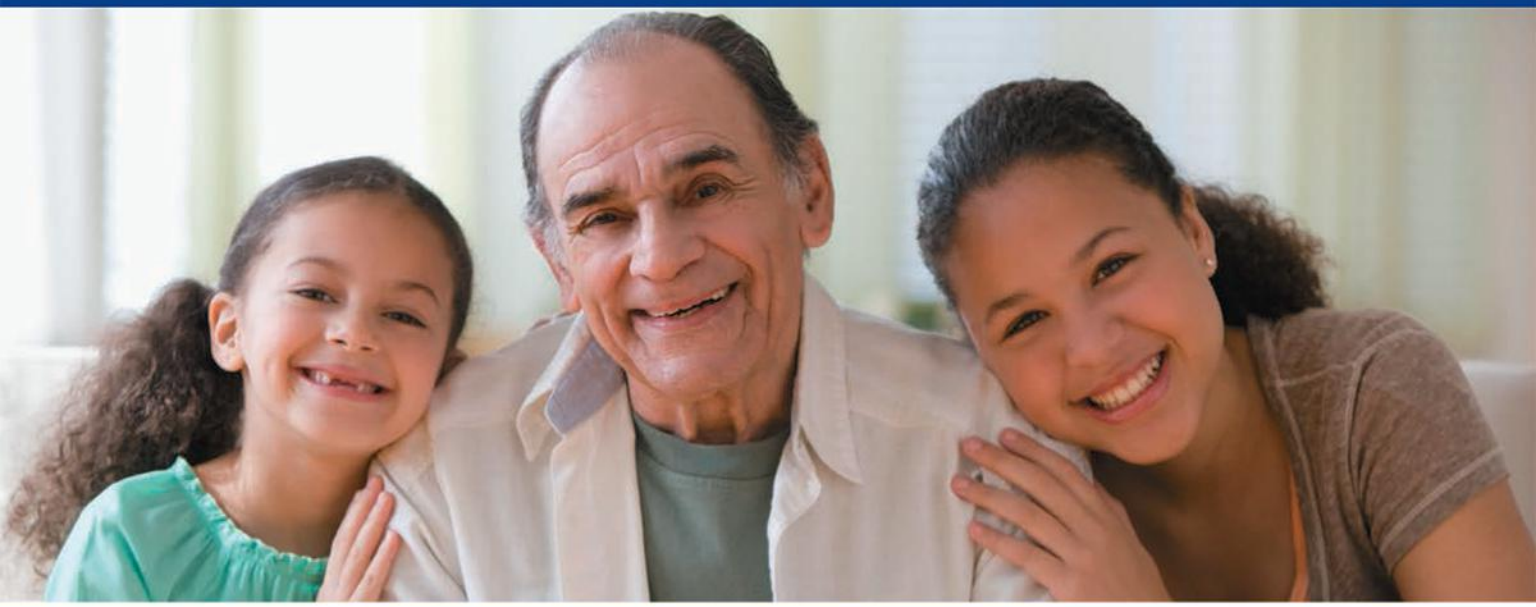
THE PEARSON COMMUNICATION SCIENCES AND DISORDERS SERIES



INTRODUCTION TO COMMUNICATION DISORDERS

A Lifespan Evidence-Based Perspective

SIXTH EDITION

ROBERT E. OWENS, JR.
KIMBERLY A. FARINELLA

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A LIFESPAN EVIDENCE-BASED PERSPECTIVE

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To Our Many Friends with Communication Disorders

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PREFACE

Introducing a new edition is always exciting and exhausting. We have taken great pains to reach a balance that we hope will please our various readers, from professors to students. 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 sixth 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, specifically Chapters 5, 8, 9, and 11.
- As always, 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.
- Users of previous editions may be pleased to find that we have attempted in the Augmentative and Alternative Communication (AAC) chapter to shift the focus. In the past, this chapter has been primarily one that explains AAC rather than approaching the topic from the disorder orientation found in the other chapters. Some explanation is inherent in the topic, but it has been softened in the current edition.

- Each chapter has been reorganized so that chapter Learning Objectives are reflected in the organization of the chapter.
- In our ever-changing field, terminology is constantly in flux. We have updated each chapter to use the most up-to-date terms.
- Anatomy figures are now in color, and new medical photographs were added to Chapter 9.
- Thought Questions have been updated to generate critical thinking on a variety of concepts and techniques.

We hope that you'll agree with us that this is a more user-friendly and informative text than the previous editions. Please feel free to contact us with suggestions for further strengthening our work.

ACKNOWLEDGMENTS

Robert Owens

I am most deeply indebted to my co-author Kim Farinella, Ph.D., who is a dedicated professional and a tireless worker. Despite being a new mom and a fulltime faculty member, she has put in a herculean effort on this new edition. I am truly blessed to have had such an indefatigable co-author through this sometimes very trying task of producing a new edition. I can never acknowledge her contribution enough, but—from the bottom of my heart—thanks, Kim.

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 Carolyn Stefanco, School of Education Dean Margaret McLane, my chair Jim Feeney, and my colleagues in my department, fellow faculty members Dave DeBonis, Dierdre Muldoon, Jack Pickering, Anne Rowley, and Julia Unger, and fellow clinical faculty members Director of Clinical Education Jackie Klein, Robin Anderson, Elizabeth Baird, Nina Benway, Marisa Bryant, Sarah Coons, Jessica Evans, Colleen Fluman, Elaine Galbraith, Julie Hart, Barbara Hoffman, Melissa Spring, and Lynn Stephens. You have all made me feel welcomed and valued.

I would be remiss if I did not acknowledge the continuing love and support I receive from my best buddy 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 want to thank Dr. Bob Owens for continuing to include me as a co-author on this textbook. It is an honor to work alongside one of my favorite former professors and mentors. His course was my first introduction to the field of speech-language pathology over 20 years ago. I continue to be inspired by this great man, and hope to have the same positive influence on my students.

I want to thank my former student, Niki Knight, for recruiting her dad, Steven R. Knight, CRNA APRN to take medical photographs for us for over a year, which he provided for use in the current edition of this textbook. I am forever grateful for the amount of time and effort that Mr. Knight devoted to helping us make this edition more clinically useful.

I would also like to thank my dear friend, Margo Zelenski, and the Mayo Clinic in Scottsdale, Arizona for contributing the swallowing videos to us for use in this edition. I'm also grateful to the clients and their families who were willing to share their audio and video samples with us so that students can learn from them.

I want to thank the Pearson editorial management team, specifically, Julie Peters, Carolyn Schweitzer, Shiela Quisel, and Faraz Sharique Ali, who worked closely with us to make this edition stellar. Thank you also to Jon Theiss for editing the audio and video samples.

Finally, I want to thank my husband, Tom, for his love and support of me and our family, and his willingness to be a full-time daddy so that I could work and complete this project. It has been quite an experience and I'm enjoying every minute.

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; Adrienne B. Hancock, The George Washington University; Susan McDonald, Cerritos College. Their efforts are sincerely acknowledged.

BRIEF CONTENTS

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CONTENTS

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Introduction to Communication Disorders

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1 The Field, the Professionals, and the Clients

LEARNING OUTCOMES

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

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

Alexander Raths/Shutterstock

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 temporary laryngitis, are often frustrating. Imagine problems with eating and swallowing. We've all experienced the temporary inconvenience of trying to eat with a sore throat. What would life be like if these problems were more lasting?

Valery has loved baseball for as long as she can remember. She got it from her dad, a devoted Yankees fan. She loves to watch it and talk about it, but most of all she loves playing it. Unfortunately, she now believes because of her head injury in an auto accident that she'll never be able to even express how much she misses it. Even so, today may be momentous. Her speech-language pathologist (SLP), Pam, plans to introduce Valery to an assistive technology device that has a speech generator. Who knows what we'll hear from Valery next?

Valery is just one of millions of people who face daily communication challenges. We hope through this text to explore these challenges to communication, as well as to feeding and swallowing.

In this first chapter, we'll introduce this topic and the professionals who work with individuals who have communication and feeding and swallowing challenges. These highly trained professionals are called audiologists, speech-language pathologists, or speech/language scientists. We'll explore their roles and explain the need for evidence-based practice (EBP) and why it's important to intervention. EBP is one of the bases of this text. In addition, this first chapter provides a historical perspective and outlines the laws that mandate appropriate care for those in need. Finally, along the way, we'll explore why people choose these careers.

In the remainder of the text, we'll begin with some background material so we have a similar understanding of what comes next. We take a **holistic** approach to diagnosis and treatment of people with communicative impairments and examine the sometimes perplexing contrast between "typical" and "impaired." There are separate chapters that discuss speech characteristics such as voice, fluency, and phonology. We also provide chapters that are organized on the basis of etiology, such as neurogenic and craniofacial disorders. Within each chapter, we examine the interconnectedness of age, time of onset, social and cultural factors, and cause of the presenting disorder, and we describe evidence-based assessment and treatment practices. We recognize that it's common for an individual who demonstrates difficulties with one aspect of communication to be affected in other areas as well.

Why does someone decide to become a speech-language pathologist (SLP) or audiologist? It is mostly because of the satisfaction this person receives 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 work or volunteer experience with individuals having 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 the American Speech-Language-Hearing Association's (ASHA) name. (The Appendix describes ASHA's professional role in more detail.) Although they work primarily with people having communication disorders, SLPs are not limited to just speech and language. As mentioned, SLPs are involved in feeding and swallowing disorders and non-speech (called *nonverbal*) forms of communication

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. For example, when you had laryngitis your voice was temporarily affected. A **language disorder**, in contrast, is an impairment in comprehension and/or use of spoken, written, and/or other symbol systems, such as English. 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 differences, such as dialectal differences or speaking another language. If you've been to a country where you don't speak the language well, you know that this definitely can impede communication. While these differences may lead to communication difficulties, they are differences, not disorders, and cannot be treated by SLPs as if they are.

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.

Finally, we would be remiss if we didn't at least note that an SLP's responsibility also extends to feeding and swallowing disorders. These vary from the preterm infant with a weak sucking response to the adult patient recovering from a stroke and slowly regaining the motor control needed to chew and swallow easily.

As you can see, communication and feeding and swallowing 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 varied disorders that are the charge of the SLP and audiologist.

Maybe a few pages ago you had 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 AND THEIR ROLES

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.

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. Although it is still in its infancy, **telepractice**—provision of language assessment and intervention via the Internet—is slowly expanding, especially in underserved geographical areas (Waite et al., 2010).

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 detrimental effects and management of environmental noise. In addition, audiologists evaluate and assist individuals with **auditory processing disorders (APD)**, sometimes called central auditory processing disorders. They also 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. The ASHA CCC-A (sometimes referred to as ASHA "Cs") is the

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.

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 materials 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 of the website.

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 over 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.

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.

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 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, completed a monitored clinical fellowship year, and successfully passed a national qualifying examination. Ongoing professional development must be demonstrated through a variety of continuing education options. Since 2004, the United States, the 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 may be needed if you plan to engage in private practice or work in a hospital, clinic, public school, or other setting. Most states accept a person with a 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 of the website. If you wish to read about a career as a SLP, click on "Careers" at the top left of the website.

Thought Question 1.1

Were you surprised by the scope of possible intervention for SLPs and audiologists? Did you begin reading thinking only of speech and hearing? What surprised you the most, and why?

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.

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 fulfill many new purposes. Box 1.3 contains some observations by a speech-language scientist who enjoys the interdisciplinary nature of his work.

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.

TABLE 1.1

Credentials for speech-language pathologists and audiologists

Credentialing Organization	Speech-Language Pathologist	Audiologist
American Speech-Language-Hearing Association (ASHA)	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.

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.

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) lists graduate programs. 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 of Scholarship That's Right for You* box in the middle of the opening section of the website.

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.

BOX 1.4 | A Team Approach

Alicia is the senior speech-language pathologist in a community-based rehabilitation center in New York State. During the mornings, Alicia works with infants, preschoolers, and school-age children at the center. In the afternoons, she directs the Augmentative/Alternative Communication Program and assists severely impaired individuals of all ages to improve their communication abilities. The schedule outlined below has a bit more collaboration than is normally found in any one day, but it suggests the kinds of activities that are typical within a workweek.

8:30 A.M.	Education staff meeting for preschool children: classroom teacher, psychologist, social worker, occupational therapist, physical therapist.
9:00	Preschool class activity: eight children ages 3–4, one classroom teacher, two aides.
10:00	Individual half-hour therapy sessions with children in the preschool and school programs.
11:30	Combined physical and speech therapy for Jeramy, age 4, diagnosed with spastic cerebral palsy; work with physical therapist.
noon	Lunch
12:30 P.M.	Prepare for the afternoon.
1:00	Consult with engineer on wheelchair switch for Lucretia, age 7, who is multiply disabled.
1:30	Outpatient, David, aged 24, had been in a motorcycle accident and experiences some speech and language difficulties.
3:00	Conference with Sally Brown, Bettina's foster mother, and Barbara Sloane, the social worker for the family.
3:30	Communication Disorders Department meeting. Malcolm, an audiologist, reports on a 3-hour course he took on Saturday on cochlear implants.
4:30	The workday is officially over, but Alicia stays until 5:00 to read the professional journal *Language, Speech, and Hearing Services in the Schools,* which arrived today. Alicia is especially interested in the article about using children's books in working with preschoolers, and photocopies it to share with other staff members.

SERVICE THROUGH THE LIFESPAN

This text mentions two things—lifespan and evidence-based practice—in the subtitle. Before we move on, let's discuss each one briefly and why it's important.

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. This translates into over 65 million people in the U.S. In general, the likelihood of having a disability increases as we age. Although the exact number of individuals in the United States who have speech, voice, and swallowing and/or language disorders is difficult to determine (ASHA, 2008), they are in the tens of millions.

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). All infants in the United States must be screened for hearing loss. 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.

An interdisciplinary approach is necessary in the assessment and treatment of young children, and an Individualized Family Service Plan (IFSP), developed for each child treated, must address the needs of the entire family, with sensitivity to that family's language and culture. Early identification and intervention has been demonstrated to be highly valuable in facilitating optimum results and potentially preventing later difficulties. Some children will be diagnosed as having developmental difficulties not evident at birth.

Preschoolers with communication difficulties must also be identified and helped. For some, services begun earlier may now be handled by different agencies. The youngster may be placed in a special preschool, and professionals may continue to assist the family in addressing the child's needs.

Almost half of all SLPs are employed by school systems. They work with youngsters in all grades, addressing a full range of communication and swallowing problems. These are described in the chapters that follow. School-age children with communication difficulties often experience academic and social difficulties, which add additional urgency to the work of communication experts. Some young adults, such as those who were identified earlier as being developmentally delayed or with physical disabilities, may continue to receive certain services until they are 21 years old.

Thought Question 1.2

As you think about intervention across the lifespan and working as a member of a team, think about variations in this arrangement. Are there ages of clients or severities of disorders in which you as an SLP might work alone with a client, times when you might consult with other specialists, and still other times when you might serve as a member of a team?

Other individuals may find themselves in need of communication services for the first time later in life. For example, between 1.5 and 2 million Americans sustain traumatic brain injury each year in the United States (see Chapters 4 and 7) stemming from bicycle, motorcycle, or car accidents; falls; or firearms. As a result, they may have cognitive and/or motor problems that interfere with their ability to communicate and/or eat. The SLP plays an important role in rehabilitative efforts.

Among those over age 65, stroke, neurological disorders, and cognitive impairments may interfere with effective communication and swallowing. Hearing loss may affect at least one-quarter of people in this age group, creating a need for assessment and treatment. SLPs and audiologists work directly with such individuals. They often also work with spouses and children, as well as staff members of nursing homes and other adult facilities in providing counseling and guidance directed toward improving quality of life in these later years (Lubinski & Masters, 2001).

EVIDENCE-BASED PRACTICE

As in other professions, SLPs and audiologists use evidence-based practice to provide the best services possible.

Throughout this text, we'll try to report the best information we can, based on the research evidence available. As an SLP or audiologist (if that is your career choice), it will be your responsibility to provide the best and most well-grounded research-based intervention that is humanly possible. In other words, you should do what works best and is most effective.

Deciding on the most efficacious intervention is a portion of something called evidence-based practice (EBP). EBP is an essential part of effective and ethical intervention. The primary benefit is the delivery of optimally effective care to each client (Brackenbury et al., 2008). Using EBP, clinical decision making becomes a combination of scientific evidence, clinical experience, and client needs. In other words, research, specifically the small portion of research directly relevant to decisions about practice, is combined with reason when making decisions about treatment approaches (Dollaghan, 2004).

EBP is based on two assumptions (Bernstein Ratner, 2006):

- Clinical skills grow not just from experience but from the currently available data.
- An expert SLP or audiologist continually seeks new therapeutic information to improve efficacy.

Professional journals, called peer-reviewed journals, in which each manuscript is critiqued by other experts in the field and accepted or rejected on the basis of the quality of the research, are the best sources of clinical research-based evidence.

The philosophy and methods of EBP originated in medicine, but have now been adopted in many other health care professions and related services. Ideally, EBP is a work in progress with updates as we learn more. New information may come to light through research that changes previous assumptions about that evidence. None of this relieves SLPs and audiologists of the responsibility to provide the best, most efficacious assessment and intervention possible. See the ASHA online resource at the end of the chapter.

In this discussion, we've used two terms: *efficacy* and *effectiveness*. These are sometimes difficult to discern, given the heterogeneous nature of the existing research studies, so it's important that you understand the generally accepted meanings of these terms from a clinical and research perspective. Technically, **efficacy** as it relates to clinical outcomes is the probability of benefit from an intervention method under ideal conditions (Office of Technology Assessment, 1978). There are three key elements to this definition:

- It refers to an identified population, such as adults with global aphasia, not to individuals.
- The treatment protocol should be focused, and the population should be clearly identified.
- The research should be conducted under optimal intervention conditions (Robey & Schultz, 1998). Of course, results in real-life clinical situations may differ somewhat.

Of interest is the therapeutic effect or the positive benefits resulting from treatment. The ideal treatment, then, would seem to be the one that results in the largest changes to meaningful client outcomes, with only limited variability across clients (Johnson, 2006).

Unfortunately, in the fields of speech-language pathology and audiology, only a small percentage of the research articles address intervention directly. Making clinical decisions, therefore, is not particularly easy, especially given potentially competing claims, varying clinical expertise, and client values. Still, SLPs are tasked with determining which treatment approach is best for each client. It is also important for SLPs to recognize that efficacy is never an all-or-nothing proposition (Law et al., 2004; Rescorla, 2005).

Effectiveness is the probability of benefit from an intervention method under average conditions (Office of Technology Assessment, 1978). The effectiveness of treatment is the outcome of the real-world application of the treatment for individual clients or subgroups. In short, effectiveness is a measure of "what works." Valid clinical studies must be realistically evaluated for the feasibility of applying them to intervention with specific populations and individuals (Guyatt & Rennie, 2002).

One way of determining potential effectiveness, but not the only one, may be a clinical approach's reported **efficiency** (Kamhi, 2006a). Efficiency results from application of the quickest method involving the least effort and the greatest positive benefit, including unintended effects. For example, an unintended benefit of working to correct difficult speech sounds is that it improves the production of untreated easier sounds, although the reverse is not true (Miccio & Ingrisano, 2000). Targeting more difficult sounds would seem to be more efficient.

Other factors in decision making include the clinician's expertise and experience, client values, and service delivery variables. In addition to clinical experience and expertise, individual SLP factors such as attitude and motivation are important. Clients vary widely and respond differently to intervention based on each client's unique characteristics, such as family history and support, age, hearing ability, speech and language reception and production, cognitive abilities, and psychosocial traits, such as motivation. Finally, service delivery factors include the targets and methods selected, the treatment setting, participants, and the schedule of intervention.

An SLP or audiologist must carefully discuss possible intervention options with a client and/or family, including an explanation of the research evidence. The goal is to provide sufficient information to enable the client and/or family to make an informed choice or to collaboratively plan and refine the options to suit the client and/or family preferences.

Making good clinical decisions is not always easy. High-quality evidence-based research must be evaluated critically by each SLP and applied to specific clients with specific communication disorders. EBP requires the judicious integration of scientific evidence into clinical decision making (Johnson, 2006). Although EBP can improve and validate clinical services, we must acknowledge that it can be difficult to incorporate into everyday clinical settings because of the time required for SLPs to comb through relevant research. In addition, evidence may be limited, contradictory, or nonexistent (Brackenbury et al., 2008). In the last analysis, however, the necessity of providing the best intervention services possible must be the foremost professional concern.

You can explore EBP further at two websites. The ASHA site (www.asha.org) describes EBP and offers guidance for clinical practice. Click on "Practice Management" to find the "Practice Portal" which will take you to a choice of disorders you may wish to explore. The National Institute on Deafness and Other Communication Disorders (NIDCD) site (www.nidcd.nih.gov) contains relevant health and research information. Just type the disorder in the search box in the upper right of the website.

COMMUNICATION DISORDERS IN HISTORICAL PERSPECTIVE

It is believed that many early human groups shunned less able individuals. They sometimes abandoned children who were malformed or who had obvious physical disabilities. Groups also often abandoned, deprived of food, or even killed aged people who could no longer contribute. There is also archaeological data to suggest that in some early cultures those with physical disabilities were sometimes considered to have special powers.

Over the centuries, attitudes have changed somewhat. By the late 1700s to early 1800s in some parts of the world, societal efforts were being made to help those who were unable to care for themselves. Individuals began to be classified and grouped according to their disorder. Special residences for individuals with deafness, blindness, mental illness, and intellectual limitations were established, although most were little more than warehouses providing no services other than what was necessary to keep the residents alive (Karagiannis et al., 1996).

The first U.S. "speech correctionists" were educators and others in the helping or medical professions who took an interest in speech problems (Duchan, 2002). These were accompanied by a few "quacks" who promised curing therapies or drugs. The more legitimate therapists came from already established professions. Among them were Alexander Melville Bell and his father, Alexander Graham Bell, of telephone fame. Other Americans trained with famous "speech doctors" in Germany and Austria or became interested in speech correction because of their own difficulties, often with stuttering. The first professional journal, *The Voice*, which appeared in 1879, focused primarily on stuttering research and intervention.

Early interest groups were formed primarily among teachers within the National Education Association and among physicians and academics belonging to the National Association of Teachers of Speech. The latter group formed the American Academy of Speech Correction in 1925, a precursor to ASHA, and attempted to promote scientific inquiry and to set standards for training and practice. ASHA has had varying names over the years; it finally settled on American Speech-Language-Hearing Association in 1978.

The profession of audiology originated in the 1920s, when *audiometers* were first designed for measuring hearing. Interest surged in the 1940s when returning World War II veterans exhibited noise-induced hearing loss due to gunfire or prolonged and unprotected exposure to noise. Others had psychogenic hearing loss as a result of trauma. The Veterans Administration provided hearing testing and rehabilitation.

Gradually, ASHA was able to establish professional and educational standards and to advocate for the rights of individuals with disabilities. During the 1960s in the United States and elsewhere, intense energy was directed toward the advancement of civil rights for all people. Just as the rights of women, ethnic minorities, gays, and lesbians have been and are being recast, the status of individuals with disabilities has been reevaluated, and bold reforms have been initiated. The American Coalition of Citizens with Disabilities was created in 1974; legislative action on behalf of all Americans with disabling conditions began in earnest around the same time. In many cases, people with disabilities occupied leadership roles in the push for change. As a result of this work, providing opportunities for individuals with disabilities to develop to their full potential was no longer simply an ethical position. It became federally mandated through a series of laws.

A series of laws passed by the U.S. Congress over the past 50 years mandates appropriate treatment for individuals with disabilities.

Congress enacted the Education for All Handicapped Children Act (EAHCA) as Public Law 94–142 in 1975. It mandated that a free and appropriate public education must be provided for all children with disabilities between the ages of 5 and 21. Several years later, Public Law 99–457 extended the age of those served to cover youngsters between the ages of birth and 5 years. In 1990, Congress reauthorized the original law and renamed it the Individuals with Disabilities Education Act (IDEA). IDEA addressed the multicultural nature of U.S. society. The needs of English language learners (ELLs) and those from racial and ethnic minorities were targeted for special consideration. Reauthorized in 2004, IDEA established birth-to-6 programs as well as new early intervention services. ASHA has been a vital advocacy agency throughout this long legislative process.

SUMMARY

Speech-language pathologists, audiologists, and other specialists work together to assist those with communicative impairments. They work in a variety of settings and with people of all ages. They are rewarded by contributing to the well-being of others. Professionals who are engaged in clinical service for those with communication disorders must have a master's or doctoral degree and supervised clinical experience. They must have earned the American Speech-Language-Hearing Association Certificate of Clinical Competence (ASHA-CCC) in their area of specialization.

Services are provided to individuals from birth through advanced age. The American Speech-Language-Hearing Association (ASHA) is the largest organization of professionals working with communication disorders. ASHA's missions include the scientific study of human communication, provision of clinical service in speech-language pathology and audiology, maintenance of ethical standards, and advocacy for individuals with communication disabilities. As a result, federal legislation currently mandates services for people with disabilities.

SUGGESTED READINGS/SOURCES

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2

Typical and Disordered Communication

LEARNING OUTCOMES

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

- Explain the role of culture and environment in human communication
- Describe the different aspects of human communication
- Demonstrate how communication disorders may be classified, including the names and frequency of occurrence of different types of communication disorders
- Describe in general the assessment and intervention process

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What is **communication**? It's important for us to answer that question before we can explore communication disorders. In general, we can say that communication is an exchange of ideas between sender(s) and receiver(s). It involves message transmission and response or feedback.

ROLE OF CULTURE AND THE ENVIRONMENT

Humans are social beings. Possibly the worst punishment for a prisoner is to be sentenced to isolation. Milder discipline for a teenager might include limitations on texting or email use. These restrictions are punitive because we humans are social beings. We have powerful drives to be with and to communicate with others.

It is axiomatic to say "We cannot *not* communicate" (Watzlawick et al., 1967, p. 48). Even a lack of response to someone sends a message to "leave me alone."

We communicate to make contact or to reach out to others, and to satisfy our needs, to reveal feelings, to share information, and to accomplish a host of purposes. Communication is interactive; it is a give-and-take. The importance of effective communication is highlighted when it fails or is hindered in some way. Think about how frustrated you get by a temporary lapse in Internet or cellphone service. Now imagine if that was a permanent, semi-permanent, or recurring condition.

Several variables affect communication and its success or failure. These include cultural identity, setting, and participants, to name a few. The study of these influences on communication is called **sociolinguistics**.

Cultural Identity

Each of us is a member of a language community. The more you understand about your own culture and that of the people with whom you communicate, the more effective your interaction will be. Perhaps you have traveled to a country in which a language that you did not know was spoken. You might have been able to communicate by gesture and pantomime; however, you would have to agree that while you could exchange some meaning, it fell far short of optimal communication. If this text were written in perfectly good Mandarin Chinese and you could not read that language, it would communicate nothing meaningful to you. Speakers and listeners must share competence in a common language if they are to communicate fully.

Even when two people come from the same language background, "perfect" communication is rare. This is because successful communication depends not just on language and speech but on related factors, such as age, socioeconomic status, geographical background, ethnicity, gender, and ability.

The location and the participants also influence the nature of communication. Where you interact affects how and what you'll say. You communicate differently at home, in school, in a noisy restaurant, and at a ballgame. Similarly, you might speak quite differently to your best friend, your mother, your father, your boss, your grandmother, and large audiences.

Thought Question 2.1

As the U.S. population diversifies, it's good to think about the impact of culture on communication and on disorders. Can you think of any communication differences that might be culturally based but might seem to the unaware person to be a disorder? Most of these, but not all, will affect pragmatics or language use.

The Environment

Not only does communication reflect the cultures of the speakers but it also occurs within an environment or context. In fact, the act of communication often only makes sense within a context. "Can you take out the garbage on the way?" would seem odd if uttered during a haircut. Likewise, "You're hilarious!" would seem out

of place at a funeral. There are places to ask questions and places where it would seem inappropriate.

The communication environment includes not only the location in which communication occurs, but also the people involved and the event in which they are involved. Often, the communication itself is the context. "Sure, honey" would only work as a response to the request about garbage but wouldn't make sense as a reply to being called hilarious at a funeral, especially if you had just met the individuals involved. Even when we write, we must consider the reader and must build the context on paper from the language available to us.

ASPECTS OF COMMUNICATION

As noted in Chapter 1, communication takes many forms and can involve one or a combination of our senses, including sight, hearing, smell, and touch. It can include both verbal, such as the spoken or written word, and nonverbal means, such as naturalistic gestures, facial expressions, or signs. The primary vehicle of human communication is language, and speech is the primary means of language expression for most individuals.

Language

Language is a socially shared code that is used to represent concepts. This code uses arbitrary symbols that are combined in rule-governed ways (Owens, 2016). Taken together, the characteristics of language are that it is:

- A socially-shared tool
- A rule-governed system
- An arbitrary code
- A generative process
- A dynamic scheme

Let's discuss each aspect of language separately.

Language is a social tool for relating to others and for accomplishing a variety of objectives. As pointed out earlier, others must share the language code if communication is to occur. When an infant utters "ga da da ka," we cannot call this "language" because this "code" is not shared.

Parents often assume that their infant's earliest "ma ma" or "da da" are uttered in reference to themselves. These sound combinations are not considered true words unless there is evidence that they are used meaningfully.

Many people are so accustomed to their own language that they fail to recognize its arbitrary nature. Is there anything in the sound combination or the written letters of the word *water* that resembles the wet stuff? No, words are arbitrary. Is the French word *l'eau* or the Italian *l'acqua* any more or less moist? The equivalent of the English word *butterfly* is *farfalla* in Italian, *mariposa* in Spanish, and *Schmetterling* in German—four very different renditions for that graceful creature. Some words have no equivalent in other languages. For example, the Spanish word *salsa* has no one-word English equivalent, so in the U.S. we use the Spanish word.

Each language, in addition to being composed of arbitrary but agreed upon words, consists of rules that dictate how these words are arranged in sentences. In English, an adjective precedes a noun; for example, we say, "brown cow." In French, as in many other languages, this sequence is reversed, and French speakers say, "le vache brun" ("the cow brown"). The rules of a language make up its **grammar**. Interestingly, you do not have to be able to explain the rules to recognize when they have been broken. Take, for example, the sentence "The leaves of the maple green tree in the breeze swayed." You know intuitively that the sentence doesn't sound correct.

Language is **generative**; this means that you can create new utterances. As a speaker, you don't just quote or repeat what you heard before. Instead, you present your own ideas in an individual way. Imagine trying to have a conversation if all you could do was imitate your conversation partner.

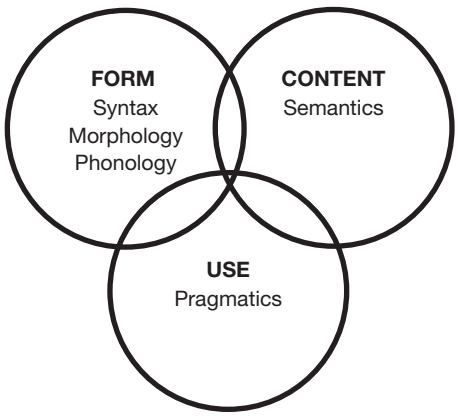
Languages are also **dynamic**; they change over time. The Academie Française has tried to keep French "pure" and true to its origins by attempting to keep "foreign" words from infiltrating. For example, it has tried to ban the English words "jet" and "drugstore." But "le jet" is apparently easier to use than the French "l'avion à réaction," and so it stays. No academy, no school, no law, and no army can keep languages from being modified. American English adds five or six new words each day, many from other languages. Pronunciation, grammar, and ways of communicating also change.

All human languages consist of similar basic ingredients. The primary interrelated components have been labeled form, content, and use. See Figure 2.1.

Form

Form consists of phonology, morphology, and syntax. **Phonology**, or the sound system of English, consists of about 43 phonemes, or unique speech sounds. Although different languages use many of the same phonemes, variations exist. Spanish and German, to name only two, do not use the English "th."

Figure 2.1 Components of language.



Sources: Data from Owens (2012) and Shadden & Toner (1997).

Speech sounds are not combined arbitrarily. **Phonotactic** rules specify how sounds may be arranged in words. Like rules of grammar, phonotactic rules are not universal. For example, "k" and "n" cannot be blended in spoken English. For this reason, the "k" in "knife" and "Knoxville" is silent for native English speakers.

Morphology, the second aspect of form, involves the structure of words. A **morpheme** is the smallest grammatical unit within a language. Words contain both **free morphemes** and **bound morphemes**. A free morpheme may stand alone as a word. For example, *cat*, *go*, *spite*, *like*, and *magnificent* are all free morphemes. If you attempt to break them into smaller units, you lose the meaning of the word. In contrast, *cats*, *going*, *spiteful*, *dislike*, and *magnificently* each contain one free morpheme and one bound morpheme. The bound morphemes *-s*, *-ing*, *-ful*, *dis-*, and *-ly* change the meanings of the original words by adding their own meanings. Bound morphemes cannot be used alone, and must be attached to free morphemes.

Syntax pertains to how words are arranged in a sentence and to the ways in which one word may affect another. In an English declarative sentence, the subject comes before the verb: "John is going to the opera." When we reverse the order of the subject and the auxiliary or helping verb *is*, we change the meaning of the sentence and end up with a question: "Is John going to the opera?" One word can also change another. We say "I walk" but "She walks." The *s* on the verb occurs because of the pronoun *she*. This also occurs with *he*, *it*, and singular nouns, such as *puppy*. "I walk" but "The puppy walks."

Content

Because language is used to communicate, it must be about something, and this is its content, meaning, or **semantics**. **Semantic features** are the pieces of meaning that come together to define a particular word. For example, *girl* and *woman* share the semantic features of *feminine* and *human*, but *child* is generally considered a feature in *girl* and not in *woman*. You'll notice that we said "generally" because, although most of us think of a girl as being young, it is common among some groups of people to refer to any woman as a "girl." Each word has multiple meanings, as you can quickly verify by looking in the dictionary. It is the other aspects of language, such as use and form, that determine which of these definitions is appropriate in context.

Use

If you are beginning to think that this is complicated, you're right. As we said earlier, social and cultural factors influence the way language is used. Use, or **pragmatics**, is the driving force behind all aspects of language. We speak for a reason. It is the purpose of our utterance that primarily determines its form and content. For example, if you are with a friend and are hungry, you might say, "Let's get something to eat." If the purpose were a simple biological drive, then simply "Eat" might suffice. Remember Cookie Monster? "Cookie!" But who and where you are, whom you are with, and the time of day also influence what you say. If you are at your home, and you have invited a friend to dinner, you might say, "Dinner is ready." If you are working with someone as noon approaches, you might suggest, "Let's break for lunch."

While all aspects of language are important, it is the use or the purpose of communication that dictates form and content.

Pragmatic rules vary with culture. For example, in the United States business meetings tend to be very task-oriented. Very little time is spent on social exchanges; the work to be done has center stage. In Saudi Arabia, however, when two people meet for the first time for business purposes, they might spend the entire session talking about family and friends and not get to the meat of the business until the second meeting. The rules for business conversations in each of these societies are different. A few general rules for speakers of American English are presented in Figure 2.2.

Speech

Speech is the process of producing the acoustic representations or sounds of language. Features such as articulation, fluency, and voice interact to influence speech production. The final product reflects the rapid coordination of movements associated with each of these features.

Articulation

Articulation refers to the way in which speech sounds are formed. How do we move our tongue, teeth, and lips to produce the specific phonemes of a language? How do we combine these individual sounds to form words? Chapter 8 explains the nature of speech sound production and describes the problems that may occur.

The component of speech that includes rate and rhythm is referred to as prosody. Prosodic features are known as suprasegmentals. *Supra-* means "above" or "beyond," so suprasegmental features go beyond individual speech sounds (or segmental units) and are applied to words, phrases, or sentences. Stress and intonation are also suprasegmental features of speech production that are discussed later in this chapter.

Figure 2.2 A sampling of pragmatic rules for speakers of american english.

1. Only one person speaks at a time. Each person should contribute to the conversation.
2. Speakers should not be interrupted.
3. Each utterance should be relevant.
4. Each speech act should provide new information.
5. Politeness forms reflect the relationship of the speakers.
6. Topics of conversation must be established, maintained, and terminated.
7. The speaker should be sensitive to successfully communicating the message, avoiding vagueness and ambiguity.
8. The listener should provide feedback that reflects comprehension of the message.

Although most of the time we attempt to use a clear, sufficiently loud voice, sometimes our meaning may be more effectively communicated by a whisper, a whine, or a throaty rasp. When you are upset, your voice might sound angry to the point where someone says, "Don't use that tone of voice with me." Clearly, tone communicates information.

Fluency

Fluency is the smooth, forward flow of communication. It is influenced by the rhythm and rate of speech. Every language has its own rhythmic pattern, or timing. Do we pause after each word that we speak? Do we pause after each sentence? If we do, how long do the pauses last? What is our phrasing? You'll note that timing is not an isolated feature of speech. A word or syllable that is held tends to be emphasized and said more loudly.

The speed at which we talk is our **rate**. Overall rate can reveal things about us. It may provide clues about where we come from. For example, people from New York usually speak more rapidly than those from Georgia. However, if you habitually speak very quickly, it may suggest that you are in a hurry, are impatient, or have a great deal to say. By contrast, slow speech may connote a relaxed or casual demeanor.

Voice

Voice can reveal things about the speaker as well as about the message. A person with a hoarse voice might (correctly or not) communicate to others that she or he smokes. A person with a soft, high-pitched voice might be communicating youth or immaturity. A deep, throaty voice might connote masculinity or authority.

Both the overall level of loudness and the loudness pattern within sentences and words are important. A generally loud voice may communicate strength; a soft one may suggest timidity. By stressing different words within a sentence, you are also conveying different meanings. Say the following sentence in each of the ways listed here, with the emphasis or increased loudness on the underlined word. Notice how the meaning changes:

I got an "A" on my Physics final.

I got an "A" on my Physics final.

I got an "A" on my Physics final.

I got an "A" on my Physics final.

Placing the stress on different syllables within certain words also changes the meaning. Stressed syllables often have long vowels, as in the first word in each of the following pairs:

record	record
recess	recess
present	present

You might have noticed that as you vary the stress, the pitch, duration, and pronunciation of different speech sounds may also change. The pitch tends to go up as the loudness is increased. Similarly, you are likely to prolong the syllable that receives stress.

The symbols /ɛ/, /ə/, and /l/ represent phonemes, or speech sounds to be described in more detail in Chapter 9.

Pitch is a listener's perception of how high or low a sound is; it can be physically measured as frequency or cycles per second, called hertz. **Habitual pitch** is the basic tone that an individual uses most of the time. Women usually have higher-pitched voices than men, and children have higher voices than adults of both sexes. So our habitual pitch tells something about who we are.

Pitch movement within an utterance is called **intonation**. Say the following sentence by bringing your pitch down for the last word and then say it by raising your pitch at the end:

She wants to do the dishes.

A rising intonation can turn a statement into a question.

You'll notice that intonation influences meaning. You should also observe that as you alter intonation, your rhythm and loudness patterns also change.

Punctuation and font type and size may contribute to the meaning of an email. A century ago, perfumed letter paper modified the written word.

Nonverbal Communication

Although most humans rely heavily on spoken communication, some researchers report that about two thirds of human exchanges of meaning take place nonverbally. The term *nonverbal* encompasses both the suprasegmental aspects of speech that we described in the previous section and the **nonvocal** (without voice) and nonlinguistic (nonlanguage) aspects of communication.

Artifacts

The way you look and the way you have decorated yourself and your personal environment communicate something about you. People make assumptions about our personalities and trustworthiness on the basis of our possessions, clothing, and general appearance.

Kinesics

Kinesics refers to the way we move our bodies, called *body language*. This includes overall body movement and position as well as gestures and facial expression. Gestures such as a "brush-off" and facial expressions such as a frown have explicit meanings, and they support and contribute to the larger speech system. By contrast, signing may be a primary means of communication for someone who has deafness. ASL is described in greater detail in Chapter 12 and Chapter 13.

Space and Time

The study of the physical distance between people as it affects communication is called **proxemics**. Proxemics not only reflects the relationship between people but is also influenced by age and culture. Infants, children, people from Middle Eastern and Latin cultures, and those with strong emotional attachments, such as lovers, tend to interact in intimate or close proximity, very near one another.

Tactiles are touching behaviors. Who touches whom and how and where on the body the touch occurs can reveal a great deal. Although children in our society learn that touching others is usually not appropriate and are told early on to "keep your hands to yourself," infants' earliest interactions normally include considerable parental and caretaker touch.

Speech-language pathologists recognize the heterogeneous nature of the U.S. population and strive to be sensitive to both verbal and nonverbal variations.

Chronemics is the effect of time on communication. Again, cultural and age factors influence this aspect of communication. People from German and Scandinavian backgrounds tend to be exactingly prompt, while those from Latin and African cultures may permit greater time flexibility. Status and context also affect chronemics. You might be kept waiting at the doctor's office, but your doctor does not expect to have to wait for you. Promptness is part of the U.S. work ethic. If you are routinely late to class or to a job, you've violated a chronemic norm and might have to pay a price in terms of a lowered grade or lost employment.

Age, sex, education, and cultural background influence every aspect of communication. These natural variations in communication are not impairments. Differences reflect regional, social, cultural, or ethnic identity and are not a disorder of speech or language.

As we mature, our communication changes. The crying of an infant may become the call "Mommy" within a year. Table 2.1 offers a sampling of typical communication features at different life stages. We describe communication impairments in the next section.

Communication Through the Lifespan

The most complex and challenging task newborns face is learning the abstract code called "language" that those around them use to communicate. To do this, infants must first learn the rudiments of communication and begin to master the primary means of language transmission, called "speech." The early establishment of communication between children and their caregivers fosters the development of both speech and language, which in turn influences the quality of communication. This intricate pattern is fostered by physical, cognitive, and social development as a child matures. In a seeming reversal, language proficiency is critical to development of higher cognitive and social skills (Oller et al., 2001).

The key to an infant becoming a communicator is being treated as one. The process of learning speech and language is a social one that occurs through interactions of children and the people in their environment. Although both speech and language depend on physical and cognitive maturation, neither is sufficient to account for the rapid developments in children's communication.

Speech and language are learned within routines and familiar activities that shape children's days and within conversations about food, toys, and pets and later about school, social life, and the like. A young child uses a variety of speech cues and patterns to break continuous speech into more readily interpretable chunks (Sanders & Neville, 2000). For example, no words in American English begin with the "ks" (written /ks/) sound, but that same combination can signal the end of a word.

In different cultures, the type of child–caregiver interaction, the model of language presented to the child, and the expectations for the child differ, but each is sufficient for the learning of the language of the culture. Learning to become an effective communicator is a dynamic and active process in which children in our culture become involved in the give-and-take of conversations. Even the more formal educational processes of learning to read and write are initially social and occur within early book-reading activities in the home involving children and caregivers.

Every person's speech and language continue to change until the end of life. Communication reflects the changes occurring in us and around us. Even the

TABLE 2.1

A lifespan view of typical communication

Receptive Communication						Expressive Communication				
Age Range		Language				Speech			Nonverbal Communication	
		Form	Content	Use	Articulation	Fluency	Voice	Artifacts	Kinesics	Space/Time
Infancy	Quiets/turns to human voice; Distinguishes speech sounds	Prelinguistic sound-making	No "true" speech; vocalizations; body movement focus on here and now	Obtain assistance; imitate, respond to others	Gurgles, coos, babbles	Rhythm and rate begin to resemble that of surrounding language toward end of year	Varies volume, rate, pitch	Toys, materials given to child; may "give" objects to others	Gestures precede meaningful spoken language	Close proximity/ immediacy
Toddler	Responds to some verbal commands	Vocabulary growth from 4 to 300 words; moves from single word to short utterances	Familiar names, actions	Imitate, greet, protest, question	Simplified phonology		High (childish) pitch, more variability than adults	Toys; begins to construct things; start of imaginary play	Gestures slowly take second place to spoken language	Proximity decreases; begins to comprehend "now" and "later"
Preschool	Comprehension far exceeds expression; enjoys stories, books; follows increasingly complex commands; comprehends simple humor	Vocabulary grows from 1,000 to more than 2,000 words; uses complete sentences	Immediate to imaginary; includes past, present, and future	Greet, request, protest, inform, pretend, entertain	Almost all speech sounds correctly produced by the end of this period	Part-word, whole word, and phrase repetition not uncommon	Adjusts to listener; often used effectively to enhance verbal communication	Tremendous variability; reflects social/ cultural background	Gestures used to enhance verbal communication	Begins to understand personal space

TABLE 2.1
(*Continued*)

Receptive Communication						Expressive Communication				
Age Range		Language				Speech			Nonverbal Communication	
		Form	Content	Use	Articulation	Fluency	Voice	Artifacts	Kinesics	Space/Time
School-age	Reading skills improve; receptive language grows to 50,000 words by sixth grade, 80,000 words end of high school; comprehension becomes adult-like	Vocabulary grows to 25,000 to 30,000 words; slang important; written language more complex than spoken language	Very broad; includes distant as well as near and abstract concepts	May enjoy talking, sharing thoughts, raising and answering personal as well as abstract questions; narrative skills expand	Speech sounds correctly produced	Rate may be rapid; fluency is good	Pitch drops to adult levels with puberty; voice used to supplement verbal message	Clear indication of what is wanted; reflect peer group, gender	Gestures used in wide array of means to supplement speech	Becomes territorial; mature understanding of space and time
Early and middle adulthood	Comprehension increases	Education and occupation may be reflected in vocabulary	Full range of topics; written language continues in importance and sophistication	Instructing; directing others may be added if not there earlier	Mature articulation	Use of rhythm and rate to enhance message	Mature pitch; full-bodied vocal quality	Tremendous variety dependent on sociocultural and individual variables	Body movement and gestures continue to supplement verbal communication	Space may reflect relative "importance" in environment as well as cultural factors
Advanced age	Comprehension may decrease with hearing loss	Vocabulary may reflect "older" generation	May focus more on past than future	May have limited communication partners; speech may be major way to achieve companionship	Normally not impaired	Rate may slow	Pitch may increase; vocal quality may become "thinner"	Old/familiar items may become increasingly treasured	Body movement may be less forceful	May crave touch, as significant others become less available

Sources: Data from Owens (2012) and Shadden & Toner (1997).

Note: This is a sampling of communication behaviors. Variability within each age group is the norm.

Communication is established very early between child and caregiver.

means of communication can change. Your grandparents began life without a computer and had to learn this new means of communication. We, the authors, had to learn to use computers to communicate when we were young adults. You, in contrast, grew up with the Internet and cellphones. Many preschoolers now have tablets and Kindles.

Children become communicators because we treat them as if they already are.

Languages change, too. New words and phrases have entered American English within your lifetime, such as *Internet*, *Bluetooth*, *iPod*, *smartphone*, *texting*, *hip-hop*, and *hybrid vehicle.* Other cultures and languages have contributed *mullah*, *sushi*, *bodega*, and *tsunami*. A competent communicator continues to adapt to changes in the language and in the communication process.

COMMUNICATION AND SWALLOWING IMPAIRMENTS

Now that you have an idea of the complexity and varied nature of communication, it should be easy to see that much can go wrong. Let's expand on what we discussed in Chapter 1. We can further define communication disorders as consisting of disorders of speech (articulation, voice, resonance, fluency), oral neuromotor patterns of control and movement, feeding and swallowing disorders, language and/or literacy impairment, cognitive and social communication deficits, and hearing and processing difficulties. This definition does not confine itself to speech communication and includes other communication systems. That's a lot! Although communication disorders may be categorized on the basis of whether reception, processing, and/or expression is affected, the three dimensions are often intertwined, reflecting the integration of the processes. Figure 2.3 presents various systems for categorizing speech and language disorders. In similar fashion, swallowing disorders could be classified based on the type and severity of the impairment.

The American Speech-Language-Hearing Association (ASHA) website (www.asha.org) discusses various disorders that affect children and adults who may benefit from the help of an SLP or audiologist. Type in the disorder you wish to explore in the search box in the upper right of the website.

Etiology, the cause or origin of a problem, may be used to classify a communication problem. Disorders may be due to faulty learning, neurological impairments, anatomical or physiological abnormalities, cognitive deficits, hearing impairment, damage to any part of the speech system, or a combination.

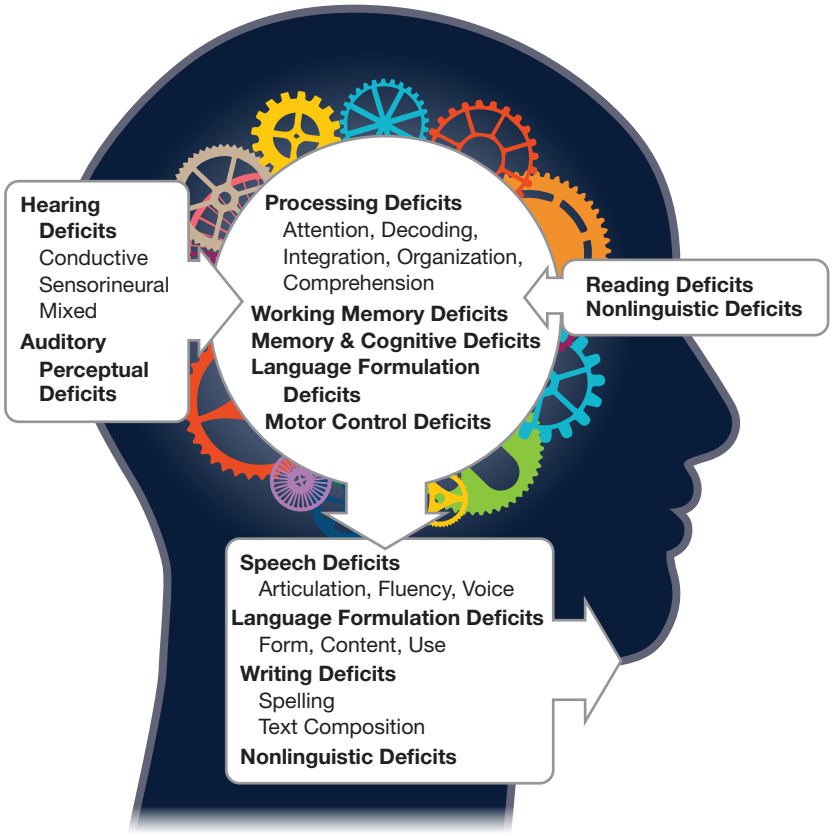
Sometimes a dichotomy is made between **congenital** and **acquired** problems. Congenital disorders are present at birth; acquired ones result from illness, accident, or environmental circumstances anytime later in life. An individual may have a disorder that is either congenital or acquired, or both. Finally, an individual's disorder may range from borderline or mild to profoundly severe.

Speech-language pathologists are concerned with both verbal and nonverbal disorders of communication.

As mentioned in Chapter 1, typical variations in communication and swallowing are not disorders. For example, **dialects** are differences that reflect a particular regional, social, cultural, or ethnic identity, and are not disorders of speech or language. Likewise, differences found in the speech and language of English language learners (ELLs) are not disorders.

Figure 2.3 Possible speech, language, and hearing disorders.

Speech communication disorders can have various causes which are congenital and/or acquired and severities ranging from mild to severe. Nonverbal and literacy impairments can further complicate communication impairments.



Language Disorders

In this section, we give you an overview of different types of disorders. This will give you the basics for later, more in-depth discussions. Although we focus on form, content, and use, language impairments tend to cross these boundaries. A deficit in one area tends to affect the others.

Disorders of Form

As explained earlier, language form includes phonology, morphology, and syntax. An error in sound use, such as not producing the ends of words ("hi shi i too sma" for "his shirt is too small"), constitutes a disorder of phonology. This in turn, might affect morphology if a child omits the plural *–s* or the past tense *–ed*. Syntactical errors include incorrect word order and run-on sentences (for example, "I want to go mall and go skate and buy peanuts and you come with me 'cause I want you to but not Jimmy 'cause he's not big enough to go skate"). These errors in school-age children may affect both academic achievement and social well-being.

Disorders of form may be due to many factors, including sensory limitations such as hearing problems or perceptual difficulties such as learning disabilities. Limited exposure to correct models may also hinder a child's language development. For many children who are delayed in their production of mature language forms, the cause is not apparent. Neurological disorders caused by stroke or traumatic brain injury may result in a loss of access to language even though language remains intact.

Patterns that seem like errors at first are sometimes a reflection of a particular speech dialect or the influence of another language. An SLP must distinguish between dialectal or second language variations and disorders.

Disorders of Content

Children and adults with limited vocabularies, those who misuse words, and those with word-finding difficulties may have disorders of content or semantics. Similarly, limited ability to understand and use abstract language, as in metaphors, proverbs, sarcasm, and some humor, suggests semantic difficulties. A persistent pattern of avoiding naming objects and referring instead to "the thing" is another indication of a disorder of content. Although limited experience or a concrete learning style may contribute to this problem in youngsters, among older people cerebrovascular accidents (strokes), head trauma due to accidents, and certain illnesses, such as cognitive impairment (previously called dementia), may result in word-retrieval problems and other content-related difficulties.

Disorders of Use

It is not uncommon for an individual to have an impairment in more than one aspect of communication.

Pragmatic language problems may be related to limited or unacceptable conversational, social, and narrative skills; deficits in spoken vocabulary; and/or immature or disordered phonology, morphology, and syntax. Examples of impaired pragmatic language skills might include difficulty staying on topic, providing inappropriate or incongruent responses to questions, and constantly interrupting the conversational partner. Culture, group affiliations, setting, and participants described earlier in this chapter play a major role in judgments regarding pragmatic competence.

Speech Disorders

As mentioned earlier, disorders of speech may involve articulation (the production of speech sounds), fluency (rhythm and rate), or **voice** (pitch, loudness, and quality). They may affect people of all ages, be congenital or acquired, be due to numerous causes, and reflect any degree of severity.

Disorders of Articulation

Production of speech requires perception and conceptualization of the speech sounds in a language as well as motor movements to form these sounds in isolation and in connected speech. You must have both a mental/auditory image of the sound you are going to say and the neuromuscular skills to produce the sound. The cognitive and theoretical concepts of the nature, production, and rules for producing and combining speech sounds in language is known as *phonology*, which we know from the previous section is an aspect of language. The actual production of these sounds is called **articulation**.

It is not always easy to determine whether an individual's speech-sound errors indicate an impairment of phonology or articulation. To sort this out, SLPs identify the phonemes that are incorrectly produced and look for error patterns that may point to phonological disturbances. The sound system of a language is usually fully in place by age 7 or 8. Children with multiple speech-sound errors past age 4 may have *phonological* difficulties. The causes of phonological disorders are often not known but may result from faulty learning due to illness, such as ear infections, hearing or perceptual impairments, or other problems in the early years.

An SLP is interested in a client's ability to move the structures needed in speech, such as the jaw, lips, and tongue. The causes of articulation disorders include neuromotor problems such as cerebral palsy, physical anomalies such as cleft palate, and faulty learning. When paralysis, weakness, or poor coordination of the muscles for speech result in poor speech articulation, the disorder is called **dysarthria**. In contrast, apraxia of speech, although also poor articulation due to neuromotor difficulties, appears to be due to programming the speech mechanism, not muscle strength. Dysarthria and apraxia can affect both children and adults. Assessment and treatment of phonological and articulatory disorders are described in Chapter 10.

Disorders of Fluency

As we described earlier, fluency is the smooth, uninterrupted flow of communication. Certain types of fluency disruptions are fairly common at different ages. For example, many 2-year-olds repeat words: "I want-want-want a cookie." Around age 3, youngsters often make false starts and revise their utterances: "Ben took . . . he broked my crayon." Because this speech pattern is so common, it is sometimes referred to as **developmental disfluency**. Even typically fluent adults occasionally use **fillers** ("er," "um," "ya know," and so on), **hesitations** (unexpected pauses), **repetitions** ("g-go-go"), and **prolongations** ("wwwwell"). When these speech behaviors exceed or are qualitatively different from the norm or are accompanied by excessive tension, struggle, and fear, they may be identified as **stuttering**. Appropriate diagnosis and intervention when warranted are the task of an SLP (Yairi et al., 2001).

Speech-language pathologists use several indices to differentiate developmental disfluency from early stuttering.

Fluency disorders are generally first noticed before 6 years of age. If remediation efforts are not made or are unsuccessful, this condition might continue and even worsen by adulthood. Adult onset of disfluency also occurs. Advancing age, accidents, and disease can all disrupt the normal ease, speed, and rhythm of speech. The causes of nonfluent speech are typically unclear; this is explored further in Chapter 8.

Disorders of Voice

As in other areas of speech, voice matures as a child gets older. From uncontrolled cries to carefully modulated whispers, shouts, and variations in pitch, the development of voice follows a predictable pattern. Although occasionally children are

born with physiological problems that interfere with normal voice, more common is the pattern of **vocal abuse**. It is characterized by excessive yelling, screaming, or even occasional loud singing that results in **hoarseness** or another voice disorder.

Habits such as physical tension and excessive yelling, coughing, throat clearing, smoking, and alcohol consumption can disrupt normal voice production. These behaviors may result in polyps, nodules, or ulcers on the vocal folds where voice production begins. Disease, trauma, allergies, and neuromuscular and endocrine disorders can also affect voice quality. For example, individuals with Parkinson's disease, a progressive neurological disorder affecting the range of muscle movement, may have a soft voice with limited pitch and loudness variation.

Hearing Disorders

A hearing disorder results from impaired sensitivity in the auditory or hearing system. It may affect the ability to detect sound, to recognize voices or other auditory stimuli, to discriminate between different sounds, such as mistaking the phoneme /s/ for /f/, and to understand speech.

Deafness

When a person's ability to perceive sound is limited to such an extent that the auditory channel is not the primary sensory input for communication, the individual is considered to have deafness. Deafness may be congenital or acquired.

Universal neonatal hearing screening is mandated by law in many states. In this way, congenital deafness can be identified and addressed very early.

Total communication, including sign, speech, and speechreading, is often considered the most effective intervention for deafness. **Assistive listening devices (ALD)**, **cochlear implants**, and **auditory training** may be helpful. These are explained in Chapter 12.

Hard of Hearing

A person who is hard of hearing, in contrast to one who is deaf, depends primarily on audition for communication. Hearing loss may be temporary due to an illness, such as an ear infection, or permanent, caused by disease, injury, or advancing age. Hearing loss is usually categorized in terms of severity, laterality, and type. The severity of a hearing loss may range from mild to severe. It may be bilateral, involving both ears, or **unilateral,** affecting primarily one ear. Finally, the loss may be **conductive**, **sensorineural**, or **mixed**. A conductive loss is caused by damage to the outer or middle ear. People with this type of loss usually report that sounds are generally too soft. A sensorineural loss involves problems with the inner ear and/or auditory nerve. This type of damage is likely to affect a person's ability to discriminate and consequently understand speech sounds, although they may "hear" them. It's typical for some older people to report that they hear just fine but wish others would not mumble. Mixed hearing loss, as the name implies, is a combination of both conductive and sensorineural loss (see Chapter 12 for further discussion).

Auditory Processing Disorders

An individual with an auditory processing disorder (APD) may have normal hearing but still have difficulty understanding speech. Individuals with APDs struggle to keep up with conversation, to understand speech in less-than-optimal listening

conditions (i.e., degraded speech signal, presence of background noise), to discriminate and identify speech sounds, and integrate what they hear with nonverbal aspects of communication (DeBonis & Moncrieff, 2008). These difficulties are sometimes traced to tumors, disease, or brain injury, but often the cause is unknown. APDs can occur in both children and adults. A special battery of auditory diagnostic tests is used to determine or rule out APDs; however, there is currently no "gold standard" to ensure correct identification of the disorder (McFarland & Cacase, 2006). APDs may coexist with other disorders, including attention-deficit/hyperactivity disorder (ADHD) and speech-language and learning disabilities (ASHA, 2005c).

Swallowing Disorders

Difficulty swallowing is called **dysphagia**, and stated simply it means difficulty moving food or liquid from your mouth to your stomach. In some cases dysphagia may be associated with pain, or swallowing may be impossible. Persistent dysphagia may indicate a serious medical condition. Although swallowing difficulties may occur at any age, dysphagia is more common in older adults. The causes of swallowing problems vary, and treatment depends on the cause. These causes are usually associated with other neuromuscular disorders.

Thought Question 2.2

At this point, you've had a very brief introduction to communication and swallowing disorders. Which areas interest you most? Why?

How Common Are Communication Disorders?

Before we attempt to estimate the numbers of people who have disorders of communication and swallowing, we should examine the concept of normalcy.

What Is "Normal"?

A recent cartoon showed an empty room and a sign reading "Meeting of Members of Functional Families." The implication was that there are no functional, or "normal," families. Likewise, we could ask, "Is anybody normal?" If anything, variability is the norm. We humans are remarkable in our diversity. Just as no two snowflakes are identical, no two individuals, even twins, are exactly alike. Our faces, fingerprints, and manner of communication are unique.

Most measures of humans, such as the number of individuals at varying heights, will result in what is called a "bell-shaped curve." We see this phenomenon with test scores as well. Most people will cluster near the average or the *mean* and will be considered "normal," typical, or average. Higher or lower scores are above or below average. An individual performing in the lowest 5% to 10% would have a score considered to be significantly below average. If we are testing language ability, such a low score may indicate a language disorder.

Because the word *normal* suggests "without problems," we, the authors, prefer to use the term *typical* when we mean "like most others of the same age and group." Classifying people on the basis of statistical percentage is little more than a numbers game. A more valid approach requires clear definitions of speech and language disorders and a thorough analysis of performance.

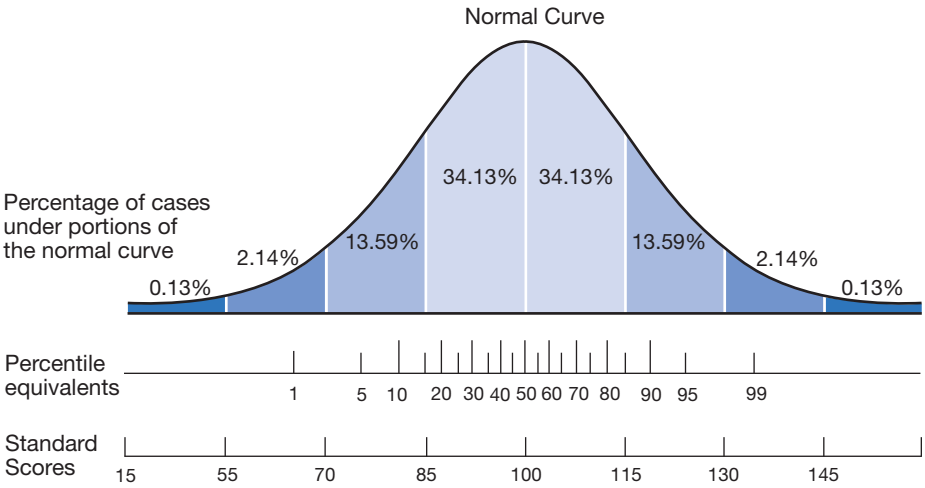
Thought Question 2.3:

Although we prefer the term *typical* rather than *normal*, what does "normal" mean to you? Does it matter to you? If so, how would you define "normal"?

Communication and Swallowing Disorders as Secondary to Other Disabilities

Most communication disorders are secondary to other disabilities. For example, children with a cleft palate have physical health problems as well as voice and articulation disorders. People with cerebral palsy typically have motor deficits beyond speech and swallowing. Children with learning disabilities are especially likely to

Figure 2.4 The normal curve, percentile equivalents, and standard scores.



Source: Based on information from *Assessing and Screening Preschoolers*, by E. V. Nuttall, I. Romero, and J. Kalesnik, 1992, Boston: Allyn & Bacon; and *Measurement and Assessment*, by E. H. Wiig and W. A. Secord, 1992, Chicago: Riverside Publishing Co.

have language difficulties, but may also have articulation, voice, fluency, and/or hearing deficits. In addition, they experience academic and social difficulties.

Estimates of Prevalence

Prevalence refers to the number or percentage of people within a specified population who have a particular disorder or condition at a given point in time. If you determined the prevalence of stuttering in the entire U.S. population, among first-grade children, among college seniors, among U.S. males, or among U.S. females, you would get different prevalence figures in each case. For this reason, prevalence statistics must specify the population on which they are based.

The terms *incidence* and *prevalence* are often confused. Incidence refers to the number of *new* cases of a disease of disorder in a particular time period. Prevalence is the number of *new and old* cases in a particular time period.

Current estimates suggest that about 17% of the total U.S. population have some communicative disorder. About 11% have a hearing loss, and approximately 6% have a speech, voice, or language disorder. Many of those with hearing losses also have speech, voice, or language disorders.

The percentage of people with hearing loss increases with age. Between 1% and 2% of people under 18 years of age have a chronic hearing loss, compared with approximately 32% of those over age 75. Exposure to noise has contributed to the hearing loss in about a third of those affected.

Communication disorders vary with gender. For example, certain disorders, such as autism spectrum disorder, are four times as prevalent in males as in females.

Impairments of speech-sound production and fluency are more common in children than adults and more common among males than females. Speech disorders due to neurological disorders or brain and spinal cord injury occur more often among adults. It has been estimated that anywhere between 3% and 10% of Americans have voice disorders; the percentage is greater among school-age children and among people over age 65.