

SECTION 1

General Considerations



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CHAPTER 1

An Introduction to the Discipline of Communication Sciences and Disorders

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LEARNING OBJECTIVES

1. To learn about the major processes in communication
2. To understand how disorders of hearing, speech, and language adversely affect communication
3. To summarize the major types of speech, language, and hearing disorders
4. To learn about the educational background and professional activities of audiologists and speech-language pathologists
5. To understand the regulation of the professions of audiology and speech-language pathology by state agencies and professional organizations

Communication

This is a book about communication, the kinds of disorders that disrupt communication, and the ways that audiologists and speech-language pathologists treat individuals who have communication disorders. **Communication** involves an exchange of meaning between a sender and a receiver. Communication is important because it is the primary means by which we share our thoughts and feelings, express our identity, build relationships, pass on traditions, conduct business, teach, and learn. Most of the time, meaning is exchanged via a code, called **language**, which includes the words, sentences, and texts that are used to convey ideas and feelings. Language can be spoken, written, or signed. A simple way to differentiate between language and speech is to think of language as *what* you say and speech as *how* you say it.

Speakers articulate a series of programmed movements to form sequences of sounds that represent words, phrases, and sentences. Sequences of spoken sounds leave the mouth in the form of sound waves. Then listeners interpret the message by converting the acoustic (sound) energy that reaches their ears into mental representations of words and sentences. Through communication, individuals can influence society at large. At the same time, social and cultural experiences play an important role in shaping the way individuals communicate.

Individuals with Communication Disorders

Unfortunately, there are many ways that the processes involved in communication can break down. Approximately 46 million people have a communication disorder that negatively affects their ability to hear or talk (National Institute on Deafness and Other Communication Disorders, 2015b). Some of these individuals have congenital disorders, meaning they were born with a condition such as deafness (an inability to hear sounds) or cleft palate (a large opening in the roof of the mouth). Other individuals have acquired disorders, meaning the disorder manifested itself after birth, sometimes as a result of diseases (such as meningitis) or accidents (traumatic brain injury). Fortunately, there are professionals known as speech-language pathologists (SLPs) and audiologists who can assist individuals with communication disorders and their families.

This chapter presents a systematic classification of communication differences and disorders and the kinds of communicative disruptions that individuals experience when they have difficulties with one or more of the processes that contribute to speech, language, and hearing. It is important to realize that communication is a system with many reciprocal relationships. A problem with one aspect of the communication process often affects many of the other processes that are related to it. For example, children who have a hearing loss receive limited acoustic input, which adversely affects the development of their language and speech. The language and speech problems experienced by children who have a hearing loss often have an adverse impact on their social and academic development.

Communication Disorders

There are appropriate and inappropriate ways to refer to people who have unusual difficulties with communication. According to the World Health Organization (2011), the word **impairment** should be used to refer to any loss or abnormality of psychological, physiological, or anatomic structure or function. This is a relatively neutral term with respect to a person's ability to function in society. For example, a hearing impairment means only that someone has unusually poor hearing. It does not mean that the individual cannot function well in daily living and working situations. With hearing aids, the person with a hearing impairment might live life as completely and fully as people who hear well. The concept of impairment leads us to ask questions such as, "What is wrong with the person, and can it be fixed? What does this person do well? What skills and abilities can be used to compensate for this person's impairment?"

The word **disability** refers to a reduced competence in meeting daily living needs. The person with a disability might not be able to perform a particular life activity in a particular context. For example, a person with hearing impairment might not be able to communicate well on the telephone, even when he or she is wearing a hearing aid. In this case, the hearing impairment led to a disability. The concept of a disability leads us to ask, "What are the communication requirements of the environments that the individual functions in every day, and to what extent can the person access important daily living activities if some sort of compensation (such as a hearing aid) is provided?"

The term **communication disorder** is sometimes used as a synonym for impairment and other times as a synonym for disability. In this text, we use the term *communication disorder* to refer to any communication structure or

function that is diminished to a significant degree. In essence, a communication disorder interferes with the exchange of meaning and is apparent to the communication partners. Unless specifically stated, we do not imply any cultural, educational, or vocational disadvantage. Unfortunately, many people with communication disorders experience communication disabilities and **handicaps**, although this is not necessarily so.

Communication Differences

Some people communicate in ways that differ from that of the mainstream culture. We use the term **communication difference** to mean communication abilities that differ from those usually encountered in the mainstream culture even though there is no evidence of impairment. For example, when they begin school, children who have spoken Spanish for most of their lives will not communicate like their monolingual English-speaking classmates. Children who learn Spanish without any difficulty do not have a communication disorder. Unfortunately, these children's communication differences may contribute to periodic social and educational disadvantages within the school environment. These children may need extra assistance in learning English as a second language. However, unless children present communication impairments (characterized by loss of or decline in communicative structures or functions that adversely affect their communication in all the languages they speak), they should not be diagnosed with a communication disorder and should not be treated by SLPs or audiologists. There is much more information about communication differences in Chapter 3.

Person-First Language

The problems that individuals experience do not define who they are. For example, a person who stutters is not best described as a stutterer. That person may be a caring parent, a good friend, a successful business owner, and even a good communicator. For this reason, most researchers and clinicians use **person-first language** to refer to individuals with communication disorders. By "person-first," we mean that the communication disorder is a descriptor of the individual and not a person's primary attribute. We follow that convention as much as possible in this text by using such phrases as "children with language disorders" instead of "language-disordered children." When we refer to groups of individuals who present a particular disorder, we might sometimes use the name of the disorder alone (e.g., "aphasics").

When we use the name of a communication disorder to refer to the group of individuals who present that disorder, readers should know that we do not mean to imply that the disorder is the sole defining characteristic of individuals who happen to present that kind of problem. As a matter of fact, many of the people we work with tell us that they do not like to be defined by their disabilities.

Types of Communication Disorders

Communication disorders typically are categorized into speech disorders, language disorders, and hearing disorders. Additional parameters of classification include the etiological basis (cause) of the disorder and the point during the maturation of the individual that the disorder occurred. **Organic** disorders have a physical cause. For example, an adult with difficulty retrieving words after a stroke and a child who has problems producing speech sounds as a result of inadequate closure between the nose and mouth after the repair of a cleft palate have a physical problem that can account for the communication problem. In contrast, there are communication disorders termed **functional** for which a physical cause cannot be identified. For example, a man may speak at a very high pitch (sounding more like a child than an adult male) even though his vocal folds are normal. In this case of a functional disorder of the voice, there is no physical basis for the problem.

For some communication problems, it is difficult to determine whether the cause of the disorder would best be described as organic or functional. A young child may have difficulty producing speech sounds in comparison with peers, but it may not be known for sure whether the disorder is organic in nature (e.g., a result of delayed maturation of the nervous system) or functional (e.g., a result of poor speech models or lack of environmental opportunity for speaking).

When a communication disorder occurs is also an important consideration. **Developmental disorders**, such as delays in speech and language development, occur early in the maturation of the individual but may continue into adulthood. **Acquired disorders**, such as speech and language disorders resulting from brain trauma following an accident or stroke, often occur after communication skills have been fully developed. What is important to remember is that acquired disorders are those that occur *after* someone has begun to learn or has mastered his or her native language.

With these distinctions in mind, we provide a brief overview of hearing, speech, and language disorders. We make some reference to the **incidence**

(percentage of the population that experienced a disorder during their life-time) and **prevalence** (percentage of individuals with a disorder at a particular point in time) of communication disorders. More detailed information about each disorder is provided in later chapters.

Speech Disorders

Speech disorders (**ta BLe 1-1**) result from an interruption in the process of speech production. This process starts with the programming of motor movements and ends with the acoustic signal that carries the sound to the listener. By historical convention, speech disorders are categorized on the basis of the aspect of speech production (articulation, fluency, voice, etc.) that is affected.

Articulation and Phonological Disorders

Individuals with **articulation and phonological disorders** have problems with the production of speech sounds. Such problems result from deviations in anatomic structures, physiological functions, and learning. When the speech production problem is based on the way sounds are represented in the brain, it is commonly referred to as a phonological

ta BLe 1-1 Examples of Speech Disorders	
Disorder	Characteristics
Articulation and phonological disorders	Problems producing speech sounds correctly as a result of differences in anatomic structures, physiological functions, or learning
Cleft palate	Nasal loss of air during consonant production, abnormal resonance, speech sound production errors
Cerebral palsy	Articulation and voice disorders associated with abnormal muscle function in children
Fluency disorder	Unusual disruptions in the rhythm and rate of speech, often characterized by repetitions or prolongations of sounds or syllables plus excessive tension

disorder. Articulation and phonological disorders can be minimal at one extreme (interfering with the way that one or two speech sounds, like /s/ or /r/, are produced) or severe, rendering speech unintelligible. Included in this category are developmental speech disorders, neuromuscular speech disorders in adults and children, and articulation disorders resulting from orofacial anomalies such as cleft palate. The prevalence of speech disorders in preschool children is between 8% and 9%. By the time children reach first grade, approximately 5% demonstrate noticeable speech disorders (National Institute on Deafness and Other Communication Disorders, 2015b).

Fluency Disorders

A **fluency disorder** is an unusual interruption in the flow of speaking. Individuals with fluency disorders have an atypical rhythm and rate and an unusual number of sound and syllable repetitions. Their disruptions in fluency are often accompanied by excessive tension, and they may struggle visibly to produce the words they want to say. The most common fluency disorder is stuttering. Children between the ages of 2 and 6 constitute the largest group of those who stutter, which is estimated at more than 3 million Americans. However, fewer than 1% of adults stutter, suggesting that many outgrow the problem (National Institute on Deafness and Other Communication Disorders, 2015b).

Voice Disorders

The category of voice disorders usually is divided into two parts: phonation and resonance. **phonatory disorders** result from abnormalities in vocal fold vibration that yield changes in loudness, pitch, or quality (e.g., breathiness, harshness, or hoarseness). Problems closing the opening between the nose and the mouth during production of speech sounds are termed **resonance disorders**. Approximately 7.5 million people in the United States have some type of a voice disorder (National Institute on Deafness and Other Communication Disorders, 2015a).

Language Disorders

Language refers to the words and sentences that are used to represent objects, thoughts, and feelings. A language disorder is a significant deficiency in

understanding or in creating messages. There are three main types of language disorders: developmental (or functional) language disorders that occur during childhood, acquired language disorders that can occur during childhood but most often occur in older adults, and dementia, which nearly always occurs in older adults. It has been estimated that between 6 million and 8 million individuals in the United States have some form of language disorder (National Institute on Deafness and Other Communication Disorders, 2015a).

Language Delay

During the preschool years, some children have delayed language development that is not associated with a known etiology and is described as “functional.” That is, children have difficulties using and understanding language for no apparent reason. These children have smaller vocabularies, use shorter sentences, and may not say as much as most other children their age. Approximately half of the children who have significant early language delays (i.e., vocabularies with fewer than 50 words) at 2 years of age will have language growth spurts that enable them to catch up to their same-age peers by the time they are 5 years old (Paul, Hernandez, Taylor, & Johnson, 1996). Unfortunately, we do not yet know how to predict which children with early language delays will outgrow them and which children will not.

Developmental Language Disorders


Some children have impaired language comprehension or production problems that significantly interfere with socialization and educational success. These children might have a variety of problems, including difficulty formulating sentences that express what they want to say, an unusual number of grammatical errors, difficulties thinking of words they know at the moment they need them, or difficulties with the social use of language (they tend to say the wrong thing at the wrong time). As with language delay, language disorder is not associated with a specific cause. Until children are in the late preschool and early school-age years, it is difficult to distinguish a language delay from a language disorder. A language disorder may be differentiated from language delay when the impairment persists beyond age 5 and children do not catch up with their peers. Between 6% and 8% of all children have language disorders. The primary types of childhood language disorders are presented in  **Table 1-2**.

taBLe 1-2

Common Developmental Language Disorders

Disorder	Characteristics
Intellectual disability	Significantly subaverage mental function with associated difficulties in communication, self-help skills, independence, and motor development
Specific language impairment	Significant deficits in language abilities that cannot be attributed to deficits in hearing, intelligence, or motor functioning
Autism spectrum disorders	Unusual disturbances in social interaction, communication, behaviors, interests, and activities that affect the capacity to relate appropriately to people, events, and objects
Central auditory processing disorder	Difficulty identifying, interpreting, or organizing auditory information despite normal auditory acuity
Learning disability	Difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning, or mathematical abilities
Dyslexia	A specific reading disorder that results from difficulties with phonological representation and phonological analysis

Acquired Language Disorders

Acquired language disorders are caused by brain lesions, which are specific areas of damage to the brain. The most common type of an acquired language disorder is aphasia, which typically occurs in older adults after they have suffered a cerebrovascular accident or stroke. Individuals with aphasia frequently have trouble remembering words they once knew or using sentence structures they once used without any problems. Approximately 25% to 40% of stroke survivors are diagnosed with aphasia (National Aphasia Association, 2011). It has been estimated that about 1 million Americans have aphasia, and approximately 80,000 individuals acquire aphasia each year (National Institute of Neurological Disorders and Stroke, n.d.).

Traumatic injury to the brain, or TBI, is a nondegenerative acquired brain injury that results from an injury to the head, causing damage to or displacement of the brain within the skull (American Psychiatric Association, 2013).

TBI may be associated with changes in consciousness, memory problems, confusion, and other neurological symptoms. Approximately 1.7 million people experience TBIs in the United States yearly. The most likely age groups to suffer TBI include adolescents (ages 15–19) and adults who are 65 years of age or older (Faul, Xu, Wald, & Coronado, 2010). Most cases of brain trauma are caused by falls, motor vehicle accidents, collisions, and violent assaults (Dessy, Rasouli, & Choudhri, 2014).

Dementia


Dementia is a general mental deterioration resulting from a pathological deterioration of the brain that progresses and worsens over time (Bourgeois & Hickey, 2009). The degree of degeneration varies according to the cause of the syndrome but represents a significant and noticeable decrease from previous levels of social and occupational functioning. In addition to cognitive decline, individuals with dementia often experience behavioral phenomena, including paranoia, hallucinations, and stereotypic behaviors that may impede effective communication. Dementia is characterized by disorientation; impaired memory, judgment, and intellect; and shallow affect. Dementia may be primary or secondary. For example, primary dementias are those in which dementia is the major sign of organic brain disease, as in Alzheimer's disease. By contrast, secondary dementias are those that are caused by or related to other diseases such as Parkinson's disease or Huntington's disease. The prevalence of dementia from all causes is estimated to be between 5% and 7% of adults who are over the age of 60 (Prince et al., 2013). About 5.3 million Americans have been diagnosed with Alzheimer's disease (Hebert, Scherr, Bienias, Bennett, & Evans, 2003).

Hearing Disorders

People with hearing disorders have a deficiency in their ability to detect sounds. This deficiency can vary in terms of how loud sounds need to be presented before they can be heard. Hearing can also vary with respect to the pitch level of the sounds that are heard. Some individuals can hear low-frequency sounds, such as the notes from a bass guitar, better than they can hear high-frequency sounds, such as a small bell. Other individuals do not hear sounds at any frequency very well. There are three basic types of hearing loss: conductive, sensorineural, and mixed hearing loss. Conductive hearing loss occurs when sound waves are prevented from

moving through the outer ear canal, the tympanic membrane or eardrum, or the middle ear ossicles (i.e., incus, malleus, stapes). Some examples of factors that may cause a conductive loss include fluid in the middle ear, perforated tympanic membrane, otosclerosis, or even the presence of a foreign body. A sensorineural loss is the result of dysfunction in the cochlear or eighth cranial nerve that prevents the sound waves from being transformed into signals that may be interpreted by the brain. Potential causes of sensorineural loss include genetic conditions, exposure to noise, ototoxicity (e.g., drugs), autoimmune diseases such as lupus or Lyme disease, and infections such as in Meniere's disease. A mixed loss includes aspects of both conductive and sensorineural loss.

According to the American Speech-Language-Hearing Association (ASHA, 2000), of the estimated 46 million citizens with a communication disorder, more than 28 million have some kind of hearing loss. The prevalence of hearing loss increases with age. Approximately 2% of the population is born with a hearing loss. The prevalence of hearing loss increases to 11–12% between the ages of 6 and 19 years and to 50–64% between the ages of 20 and 59 years.

Hearing loss can have a large or small effect on communication depending on the degree of loss and the type of sounds that are affected (see  **Table 1-3**). People with mild degrees of hearing loss that affect only their ability to hear high-pitched sounds will miss out on final sounds of words like *bath*, but they will hear most other sounds reasonably well enough that they can usually fill in the missing pieces. For example, you can probably read the following sentence even though the letters representing the final sounds are missing, “Joh_ wen_ upstairs_ to ta_ a ba_.” However, people with a hearing loss that affects their ability to hear high- and low-pitched sounds produced at conversational speech levels will be at a significant disadvantage in communication. Imagine what you might think this sentence means if you could hear only the following sounds: “_o_ we_ u_ air_ _o_ _a_ a _a_.”

If you could not hear conversations, it would be difficult for you to interact with your friends, to take notes in your classes, or to perform the duties associated with most jobs. Thus, there can be serious social, educational, and vocational consequences of moderate to severe hearing losses. Any degree of hearing loss that impacts a child's ability to function in the classroom is an educationally significant hearing loss (Johnson & Seaton, 2012, p. 43).

Other important factors that influence the impact that a hearing loss has on education and communication include whether the hearing loss is **unilateral** (one ear) or **bilateral** (two ears), the kind of amplification that is provided, the length of time the individual has had amplification, and the attitudes of the individual and his or her family members.

Table 1-3

The Impact of Hearing Loss on Communication

Degree of Loss	Severity	Impact on Communication
15–30 dB	Mild	Can hear all vowels and most consonants spoken at conversational loudness levels. Children with this degree of loss typically experience some difficulties with communication development until they receive appropriate amplification. Adults with this degree of loss have some difficulty understanding women and children with high-pitched voices, and they may struggle with conversation in noisy environments such as restaurants.
30–50 dB	Moderate	Can hear most vowels and some consonants spoken at conversational loudness levels. People with this degree of hearing loss find it difficult to hear unstressed words and word endings. Children with this degree of loss experience significant delays in communication development. Adults with this degree of loss have some difficulty understanding others during conversations.
50–70 dB	Severe	Can hear most loud noises in the environment (car horns) but not speech unless it is spoken very loudly. Children usually have marked communication difficulties and delays. Adults miss a significant amount of information spoken in conversations.
70+ dB	Profound	Can hear extremely loud noises (jet planes landing) but cannot hear language spoken at conversational levels. Without suitable amplification, individuals with this degree of hearing loss are not able to communicate through speech.

The age of the person with a hearing loss also plays an important role in the degree of impact that a hearing loss has on communication. A moderate hearing loss that is present from birth is much more problematic than a moderate hearing loss that is contracted when an individual is 40 years old. That is because good hearing is critical for communicative development. Children who do not hear well have considerable difficulties understanding language that is spoken to them, learning to produce

speech sounds clearly, and developing the words and sentence structures necessary for expressing complex ideas. Early detection of hearing loss is absolutely critical so that children can receive intervention as soon as possible. In 2011, as many as 98% of babies born in the United States participated in newborn hearing screening (Centers for Disease Control and Prevention, 2013). Some children can profit a great deal from being fitted with a hearing aid. The sooner they receive appropriate amplification, the better it is for speech and language development. For example, children identified with a hearing loss through newborn hearing screenings have been shown to earn higher scores on measures of receptive language than children identified in other ways (Nelson, Bougatsos, & Nygren, 2008). Other children are not able to hear much even with amplification. These children need to be exposed to sign language or specialized speech training to develop language.

Many people believe that individuals who have a hearing loss simply cannot hear sounds as loud as others hear them. If this were the case, the obvious solution to any hearing loss simply would be to make sounds louder to make them audible. Although this conception of hearing loss is sometimes accurate, more often the ability to hear speech is more complicated. Not only do people with hearing impairments perceive sounds as being less loud, but they also perceive sounds as less clear. So, even when speech is amplified so that it is louder, individuals with some kinds of hearing losses may still have difficulty with **discrimination** (hearing differences between sounds) as a result of a loss of the clarity of sounds. For example, they may confuse the word *ball* for the word *doll*. In effect, they hear but do not understand because the auditory information is distorted. The degree of deterioration of the auditory image is often directly related to the degree of the hearing loss. The result is that it can be difficult to find the kind of hearing aid that will assist some people with hearing loss. Fortunately, in its short life (about 50 years), audiology has advanced to the point where diagnosis and rehabilitation measures can assist the majority of children and adults.

The Professions

The remainder of this chapter provides a brief overview of the professionals who serve individuals with speech, language, or hearing disorders. More information about the specific disorders is also provided.

Speech, Language, and Hearing Scientists

For our purposes, we consider speech, language, and hearing sciences as the investigation of anatomic, physiological, and perceptual factors that form the bases of and contribute to the production and comprehension of speech and language. Some of the research conducted in this area is directed toward the exploration of other human processes (e.g., visual processes) that may help us understand how we communicate.

Speech, language, and hearing scientists come from a variety of educational backgrounds. These professionals often hold advanced degrees, most often a doctor of philosophy. Their degrees may be awarded in areas such as engineering, anatomy and physiology, biological sciences, **communication sciences and disorders (CSD)**, education, linguistics, physics, psychology, or speech communication. There is an anticipated shortage of faculty in CSD departments because of growth in the professions, an increasing number of faculty who will be retiring, and fewer doctoral students, which means that speech scientists will be in great demand in the coming years.

Speech, language, and hearing scientists most often engage in research and teaching in university settings. However, some speech, language, and hearing scientists work for government agencies such as the Veterans Administration or for independent operations such as Bell Telephone and Haskins Laboratories. The primary goal of the speech, language, or hearing scientist is to discover and better understand human communication processes (**FIGURE 1-1**). Some scientists are engaged in research that

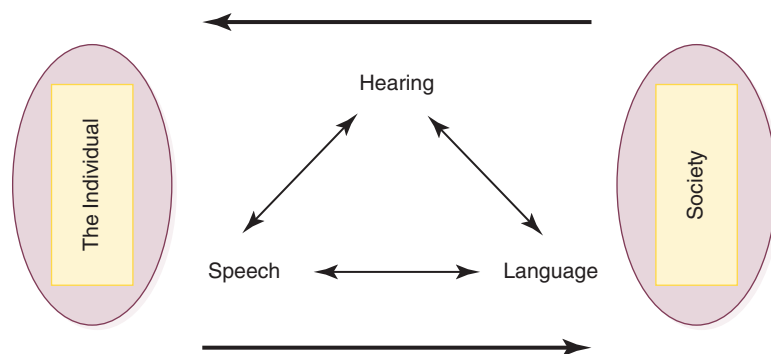


FIGURE 1-1 Hearing, Speech, and Language as Links Between the Individual and Society.

deals exclusively with the normal processes of communication. We need information on normal communication to determine whether a patient's performance on measures of speech and language functioning is within the normal range or not. Other scientists focus on the processes that are different in disordered communication. Regardless of the underlying objectives, however, basic research about communication will undoubtedly be of value to professionals in speech-language pathology and audiology and individuals with communication differences and disorders.

Some speech scientists contribute to criminal investigations. For example, speech scientists have the ability to identify characteristics in the voice that can be used to identify specific speakers. These acoustic characteristics can be as distinctive as the human fingerprint. Speech scientists can assist law enforcement personnel in identifying speakers whose voices have been recorded as part of an investigation of a crime (FIGURE 1-2).

It is vital that the practicing professional stay abreast of current research results to provide the best possible services. Some of the measurements we can obtain through speech, language, and hearing science are useful in measuring the effectiveness of treatment programs that we implement with our patients. For example, measures of the human voice can help us to determine whether a particular approach for treating cancer of the larynx is effective.

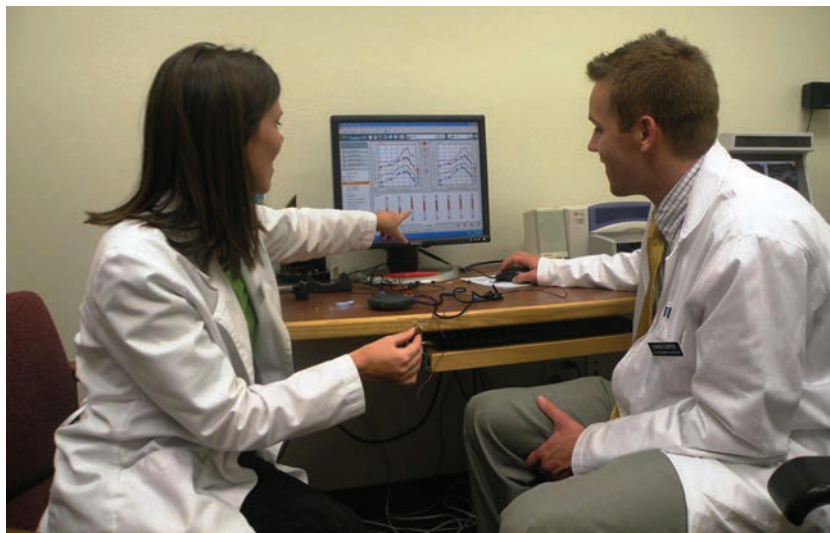


FIGURE 1-2 Two Hearing Scientists Preparing Stimuli for a Study of Speech Perception. Courtesy of Ronald Gillam, Utah State University.

A firm grounding in normal communication processes is necessary to pursue any of the professions in our discipline. As a result, a course of study emphasizing science is an integral part of the undergraduate and graduate curriculum in CSD. Courses with titles such as hearing science, speech science, language science, language acquisition, neuroscience of speech and language, psychoacoustics, and psycholinguistics are regular offerings in CSD departments and programs. Students who take courses like these will have the prerequisite knowledge they need to understand breakdowns in communication, ways to analyze those breakdowns, and ways to help individuals with communication breakdowns.

Speech-Language Pathologists

Approximately 200,000 professional SLPs work in various settings. Of those professionals, about 950 are dually certified as SLPs and audiologists. It is amazing that there were fewer than 5,000 such practitioners 50 years ago. These professionals assess and treat a variety of individuals with speech or language disorders. Job opportunities for SLPs are expected to increase by 23% between the years 2010 and 2020. Some of the reasons for this increase are linked to our expanding aging population, increased school enrollments, a need for bilingual providers, and early identification and diagnosis of speech, language, and swallowing disorders in younger populations (ASHA, 2015b).

Speech-language pathology developed from interests in disorders of speech, particularly stuttering. Much of the early research was aimed at discovering the causes of stuttering, but soon attention was directed to providing remedial services to individuals with various types of speech problems. As early as the 1920s, academic courses in “speech correction” were offered at some universities. Clinical sites for providing services to individuals with problems in speech and language, however, were limited. Initially, the vast majority of such services were provided at college and university clinics that were developed primarily as training facilities. Increasingly, however, service programs were developed in medical settings and the public schools.

Speech-language pathology professionals who practiced in the medical environment were usually called speech therapists; those who practiced in the public school setting were often called speech correctionists or speech teachers. Although the term *speech pathologist* was introduced early in the development of the field and was widely used by those in the profession for many years, the term *speech therapist* is probably the

title most often used by the general public. ASHA adopted the title *speech-language pathologist* in 1976. The term *language* was added to the official title because much of the work being done by CSD professionals concerned both speech production (how words and sentences are spoken) and symbolic language (the form and content of what is said and understood). The term *pathologist* was selected to emphasize that CSD professionals prescribe and deliver their own treatment. They do not work under a doctor's orders. Thus, although it is rather cumbersome, the designator of choice for the **profession** has become the speech-language pathologist, which is often shortened to SLP.

The kinds of activities that SLPs are engaged in depends largely on the setting in which they work (**FIGURE 1-3**). As of 2013, over half of SLPs are employed in educational settings including schools (56%) and colleges and universities (3%). About 39% of SLPs are employed in healthcare settings such as nonresidential healthcare facilities, hospitals, and residential healthcare facilities. Approximately 19% of SLPs are employed in private practice settings (ASHA, 2015a). It is the official policy of ASHA that a master's degree should be the minimum qualification for working as an SLP. Many states have licensure laws that make it illegal for individuals who do not have a master's degree to provide services as an SLP.



FIGURE 1-3 Two Speech-Language Pathologists Collecting a Language Sample from a Child. Courtesy of Ronald Gillam, Utah State University.

Audiologists

Audiology is a widely recognized profession that is practiced in many different work environments. Audiologists are professionals who study, assess, and treat individuals who have hearing impairments. Some audiologists are engaged in the evaluation and diagnosis of hearing loss; others provide educational or rehabilitative services. The number of professional audiologists has increased significantly in the past 50 years, but there are far fewer audiologists than there are SLPs. It has been estimated that between 20,000 and 25,000 audiologists practice in the United States. Most audiologists who work in healthcare settings (74%) serve nonresidential healthcare facilities (47%), followed by hospitals (25%), and then residential healthcare facilities (1%). Only a total of 15% of audiologists work in educational settings, with 8.4% employed in schools and 7% at colleges and universities. Another 29% of audiologists are employed in private practice settings. Job growth for audiology is expected to increase by approximately 37% between the years 2010 and 2020. Potential reasons for this growth include an increasing geriatric population that requires hearing and balance assessment and treatment, a large number of retirees, early identification and diagnosis of hearing loss, and a greater demand for direct and contract services from private practitioners, hospitals, schools, and nursing facilities (ASHA, 2015a).

Audiology was first identified as an area of scientific study and professional practice during World War II. This area of study grew out of a merger between audiology and otology services provided to soldiers and veterans in aural rehabilitation centers (Newby, 1958). **Otology** is the medical specialty that deals with ear disease and the peripheral hearing mechanism. Although professionals worked with persons who were hearing impaired prior to the 1940s, the professional field of audiology was not in existence before that time.

Since the beginning of the profession, many audiologists have been employed in medical environments such as physicians' offices, hospitals, and rehabilitation centers. Other audiologists, sometimes referred to as educational or habilitative audiologists, are employed in educational facilities such as public schools or schools for the deaf or hearing impaired. Increasing numbers of audiologists own private practices where they dispense hearing aids and other devices.

Audiologists have traditionally been engaged in the evaluation of the extent and type of hearing loss, assessment of the benefits of amplification, and habilitation and rehabilitation of those who exhibit hearing impairments. Primarily, their employment setting influences the kinds of activities they are engaged in. For example, audiologists employed by physicians spend most of their time evaluating patients to determine the nature and

extent of a hearing loss and the potential benefits of amplification (hearing aids). Audiologists employed in educational or rehabilitation centers are more likely to provide both assessment and rehabilitative services.

Audiologists may work with newborn children, providing hearing screenings in the neonatal intensive care unit or the newborn nursery. They also work with children in schools, with patients in hospitals and doctors' offices, and with older adults in nursing homes. Audiologists assess how well individuals hear tones, words, and sentences (**FIGURE 1-4**). Based on these assessments, audiologists make recommendations to parents, patients, physicians, and school personnel about how a hearing loss should be managed and what the ramifications of the loss will be. Most children are screened for hearing problems early in their school years. You have probably received a hearing test at some point in your life, and the examiner may well have been an audiologist. Some audiologists also program cochlear implants or provide assessments for balance disorders caused by inner ear problems. The scope of practice for audiologists is always changing and expanding, making it a very exciting profession.

The current policy of ASHA is that a doctorate of audiology (commonly referred to as an AuD) is the minimal level of education for an individual to practice as an independent professional. Satisfactory completion of specified course work and clinical practice as part of the degree is also necessary.



FIGURE 1-4 An Audiologist Administers a Hearing Test.

Courtesy of Ronald Gillam, Utah State University.

Professional and Scholarly Associations

There are a number of associations that speech, language, and hearing scientists; SLPs; and audiologists can join. Some of these associations are discussed in this section.

American Speech-Language-Hearing Association

ASHA serves as the primary professional and scholarly home for speech, language, and hearing scientists, SLPs, and audiologists. ASHA is a large organization with headquarters in Rockville, Maryland, near the nation's capital. As of year-end 2013, ASHA represented 173,070 audiologists; speech-language pathologists; speech, language, and hearing scientists; support personnel; and students in communication sciences and disorders. Of this number, 157,176 were members of the association. As of 2013, there were 355 International Affiliates representing 47 countries (ASHA, 2015a). ASHA engages in numerous activities designed to serve the needs of its members as well as individuals with communication disorders. Some of these activities include research dissemination, public relations, and lobbying for CSD professionals and the public they serve.

Another useful function of ASHA is making information available to its members and other interested individuals, including students. There is a toll-free number, 1-888-321-2724, for all kinds of information about the organization, the discipline, and the professions. ASHA also maintains a website, www.asha.org, with a vast amount of data that are continually updated. ASHA sponsors an annual convention and many local workshops that provide members and students with important information about new research results and clinical procedures.

Publications

One of the important functions of ASHA is to provide information to its members through research and professional publications. ASHA publishes

several scholarly and professional journals on a regular basis. These include the *Journal of Speech, Language, and Hearing Research*, the *American Journal of Audiology*, the *American Journal of Speech-Language Pathology*, and *Language, Speech, and Hearing Services in Schools*. In addition, ASHA regularly publishes a number of newsletters, such as the *ASHA Leader*, that address many important issues.

American Academy of Audiology

Several associations are composed almost exclusively of audiologists, whereas other organizations include subgroups of audiologists. Examples of those organizations are the Academy of Dispensing Audiologists, the Academy of Rehabilitative Audiologists, and the Educational Audiology Association. The American Academy of Audiology (AAA) was created to address the needs of all audiologists. The academy has grown rapidly to 5,000 members since it was founded in 1994. The goal of the academy is to provide an organization specifically for audiologists (Hood, 1994). Some of the activities in place or planned by AAA are also carried out by ASHA. Examples include approving and monitoring continuing education experiences for members and certifying audiologists. AAA also sponsors annual conventions and various publications.

Regulation

Consumers want to know that persons who present themselves as physicians, lawyers, SLPs, or audiologists (to name just a few service-oriented professions) have received an appropriate level of training. Just as you would not want to be operated on by a physician who failed medical school, you would not want to be fitted for a hearing aid by someone whose education and training consisted of a 10-page correspondence course on hearing aids from the Quickie School of Easy Degrees. Poor services by SLPs and audiologists can cause real harm. To protect the public interest, audiology and speech-language pathology must be regulated.

There are basically two ways in which individual professionals are regulated: **licensure** and **certification**. For the purposes of this discussion, *licensure* refers to fully credentialed SLPs and audiologists as defined by an individual state. In the case of licensure, a state government passes an act (a law) that creates a set of minimum criteria for practicing as a

professional in that state. Most licensure acts also create state-funded licensure boards of examiners who manage the law through writing implementation rules and monitoring the process and the licensees.

State licensure of speech-language pathology and audiology is relatively new. Florida adopted the first licensure act for speech-language pathology and audiology in 1969. Since that time, the number of states that regulate speech-language pathology and audiology has steadily increased. Presently, 46 states license both SLPs and audiologists. The other 4 states regulate speech-language pathology or audiology, but not both.

Certification is somewhat different from licensure in that the standards are developed and administered by professional organizations or state agencies. In the case of speech-language pathology and audiology, this function is assumed by standards boards that are affiliated with ASHA. These boards also set criteria and monitor **accreditation** of academic programs and facilities providing clinical services in CSD.

Licensure and Certification Standards

ASHA developed a standards program to certify individuals in speech-language pathology and audiology at a time when there were no state regulations and no licensure laws related to these professions. A person may be certified by ASHA and licensed in a state (or multiple states) in either speech-language pathology or audiology, or both.


SLPs can obtain the **Certificate of Clinical Competence (CCC)** in either profession from ASHA. To obtain the CCC, the applicant must have earned a master's degree or a higher degree with a major emphasis in speech-language pathology, or a professional AuD degree. The academic content areas that the course work must include are specified, and it is further required that students satisfactorily complete supervised clinical practice during their education. During their graduate education, students in speech-language pathology and audiology must have met the academic and clinical competencies specified on the Knowledge and Skills Acquisition summary form. Finally, applicants must obtain a passing score on a national standardized examination and complete an internship known as a clinical fellowship year (CFY).

It is important for practicing SLPs and audiologists to have the CCC as well as a state license. These credentials assure the consumer that the

professional has met minimum educational and practical prerequisites. In addition, professionals who provide speech-language pathology or audiology services often need to have the CCC to be reimbursed for their services. Federal laws and regulations have been adopted that require that all Medicare or Medicaid speech-language pathology or audiology services must be provided or supervised by a person holding the CCC. A number of insurance carriers that reimburse for speech-language pathology or audiology services have adopted similar requirements. Agencies, including public school programs that receive reimbursement for these services, must ensure that all providers are qualified personnel as defined by the regulations. These regulations have a major impact on funding and are a strong incentive for agencies to hire qualified personnel.

Professional education doesn't end after completing a graduate degree and qualifying for the CCC. ASHA requires that professionals complete 30 hours of continuing education, or 3.0 **continuing education units (CEUs)** in a 36-month cycle to maintain the CCC. Similarly, 41 states require continuing education for license renewal. Most state licenses are issued on an annual basis and thus must be renewed each year. In those states that require continuing education, the renewal application must include evidence of the satisfactory completion of CEUs.

Ethics

The principles of conduct governing an individual or a group are called **ethics**. Generally, we think of ethics as a measure of what is the moral or "right thing to do," whether or not it is legal. One overriding consideration for professionals (providers) who serve the public is that their activities be in the best interest of the consumer and not themselves. For example, an audiologist may recommend a hearing aid that he or she thinks is the most appropriate for the type and degree of hearing loss the patient is experiencing. An audiologist may not recommend a particular hearing aid for a patient based on the knowledge that one more sale of a certain brand of hearing aid will result in a free trip to Aruba for the audiologist. Although this is an obvious breach of ethical principles, it is often the case that professionals disagree about what constitutes ethical behavior. Therefore, most professional groups, including ASHA, have developed official codes of ethics (ASHA, 2014).  **table 1-4** summarizes the principles of ethics that have been adopted by ASHA.

ta BLe 1-4

Principles of Ethics and Representative Rules of Ethics
from the *Code of Ethics* of the American Speech-
Language-Hearing Association

principle I Individuals shall honor their responsibility to hold paramount the welfare of persons they serve professionally.

- Individuals shall provide all services competently.
- Individuals shall use every resource, including referral, to ensure that high-quality services are provided.
- Individuals shall not discriminate in the delivery of professional services on the basis of race, sex, age, religion, national origin, sexual orientation, or handicapping condition.
- Individuals shall not reveal, without authorization, any professional or personal information about the person served professionally, unless required by law to do so or unless doing so is necessary to protect the welfare of the person or of the community.

principle II Individuals shall honor their responsibility to achieve and maintain the highest level of professional competence.

- Individuals shall engage in only those aspects of the professions that are within the scope of their competence considering their level of education, training, and experience.
- Individuals shall continue their professional development throughout their careers.

principle III Individuals shall honor their responsibility to the public by promoting public understanding of the professions, by supporting the development of services designed to fulfill the unmet needs of the public, and by providing accurate information in all communications involving any aspect of the professions.

- Individuals shall not misrepresent their credentials, competence, education, training, or experience.
- Individuals shall not misrepresent diagnostic information, services rendered, or products dispensed or engage in any scheme or artifice to defraud in connection with obtaining payment or reimbursement for such services or products.

principle IV Individuals shall honor their responsibilities to the professions and their relationships with colleagues, students, and members of allied professions. Individuals shall uphold the dignity and autonomy of the profession, maintain harmonious interprofessional and intraprofessional relationships, and accept the professions' self-imposed standards.

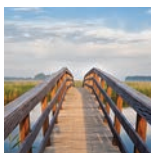
- Individuals shall not engage in dishonesty, fraud, deceit, misrepresentation, or any form of conduct that adversely reflects on the professions or on the individual's fitness to serve persons professionally.
- Individuals' statements to colleagues about professional services, research results, and products shall adhere to prevailing professional standards and shall contain no misrepresentations.
- Individuals who have reason to believe that the *Code of Ethics* has been violated shall inform the Ethical Practice Board.

Source: Reprinted with permission from *Code of Ethics*. Available from www.asha.org/Code-of-Ethics/. ©2014 by American Speech-Language-Hearing Association.

Codes of ethics are subject to change as new issues arise or as views as to what constitutes ethical behavior are modified. For example, at one time it was considered unethical for speech and language therapy to be provided solely by correspondence (over the phone, with written documents only). Today, speech-language pathology services are frequently provided via telecommunication (computer/Internet based) in areas of the country where SLPs are in short supply. Ethical considerations regarding the extent to which services may be provided over the Internet are still being developed. For example, is it ethical to provide all assessment and intervention services to patients who demonstrate significant swallowing difficulties (dysphagia) over the Internet? Some would argue that there is a safety issue with regard to choking (aspiration) that precludes SLPs from providing dysphagia services except in face-to-face contexts. Others would disagree.

Because people have different beliefs as to what constitutes ethical and unethical behavior, enforcement of ethical practices may be problematic. Among professional organizations, including ASHA, once a code of ethics has been adopted by the membership, the organization must assume the responsibility of enforcing the code. The Ethical Practices Board (EPB) of ASHA is charged with enforcing the ASHA *Code of Ethics*. If an individual member has been judged to be in violation of the code, a number of disciplinary actions are available to the EPB. These include reprimands, censures, or revocation of licenses (Irwin, Pannbacker, Powell, & Vekovius, 2007).

Most states that have adopted licensure laws have also drafted codes of ethics and have the authority to enforce them legally. Sharing of information among the states and with ASHA is critical to protect the public from unethical practitioners.



CHAPTER REVIEW

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Summary

CSD is a **discipline** that consists of three professions: speech, language, and hearing sciences; speech-language pathology; and audiology. Professionals in this discipline study and treat individuals with a variety of disorders that affect speech, language, and hearing abilities.

This chapter provides information about the professions in terms of scopes of practice, academic preparation, work settings, and populations served. Speech, language, and hearing scientists study basic communication processes and the nature of speech, language, and hearing disorders. Most scientists work in university settings, although some work in hospitals as well. SLPs assess and treat speech and language disorders in infants, toddlers, preschoolers, school-age children, and adults. They may work in medical or educational settings. Audiologists primarily test hearing and prescribe and fit hearing aids. Most audiologists work in medical settings, although many have established their own private practices.

This chapter introduces some of the differences and disorders encountered by individuals that interfere with their abilities to communicate. Some communication disorders relate to the way individuals receive information. These disorders involve various degrees and kinds of hearing abnormalities. Other communication disorders involve the way information is processed after it is received. These disorders involve various degrees and kinds of language difficulties. Finally, some communication disorders affect output, including difficulties related to speech articulation, voice, and fluency. As with any difficulty, speech, language, and hearing impairments exist on a continuum.

ASHA is the primary scholarly and professional home for the discipline. It publishes journals that disseminate research findings, promotes the professions in the media, and lobbies for CSD professionals and the public they serve. The association also operates a standards program that certifies individuals within the professions, accredits academic programs and clinical facilities, and maintains a code of ethics. Students can also join other professional organizations such as the AAA and the National Student Speech Language Hearing Association.

SLPs and audiologists are regulated through certification by ASHA and by state agencies. Professionals who obtain a master's degree (SLPs) and/or AuD (audiologists), pass a national examination, and complete a CFY are eligible for the CCC from ASHA. These same kinds of experiences are often required for obtaining a state license.

We hope you will remember that there are reciprocal relationships between input, processing, and output systems. A disorder in hearing, speech, or language will have negative consequences for the other two processes. The specific consequences vary somewhat from person to person. This is why SLPs and audiologists need to work closely with individuals with communication disorders, their families, and other professionals. This is also why any type of communication disorder requires careful analysis and description before therapy begins.

Box 1-1 personal Story by r on Gillam

I am a person who stutters. Fortunately, with the help of a number of influential speech-language pathologists, I have learned how to minimize my stuttering, my speaking fears, and my feelings of shame about stuttering to the point that stuttering plays a relatively minor role in my life. I give speeches to large audiences several times each year, I serve on or chair a number of professional committees, I teach university classes, and I spend too much time talking on the phone each day—all with relatively little concern about my speech. It's not that I never stutter, it's that my stuttering rarely interferes with my ability to communicate effectively. It wasn't always that way.

I struggled with and against stuttering during my childhood. Throughout my elementary school and middle school years, my parents took me to many speech-language pathologists, but I didn't seem to improve much. When I was a junior in high school, I started to worry about how I could possibly get along in college if I continued to stutter badly. We lived in the Denver area, and my parents suggested that I might like to see someone they had heard about at the University of Denver. I agreed, reluctantly, and we scheduled an evaluation. Dr. Jim Aten and some of his students observed me as I conversed with my parents, had me read aloud, had me tell them about some of my favorite activities, and had me make a couple of phone calls to local businesses. I remember stuttering very badly. I also remember a feeling of relief immediately after the evaluation when Dr. Aten met with me and laid out a therapy plan. Near the end of our meeting, Dr. Aten told me that he stuttered, that he had learned how to manage his stuttering to the point that it didn't interfere with his life in any way, and that one of the graduate students who assisted him with the evaluation was also a stutterer. I enrolled in therapy that semester and spent the next two years working on my feelings about my stuttering and ways to stutter more easily. Dr. Aten didn't "cure" my stuttering. I continued to receive stuttering therapy from other outstanding clinicians for another five years, and I still stutter on occasion. However, Dr. Aten was an inspiration to me, and his therapy laid a firm foundation for successes that would follow. I felt better about myself as a person and as a speaker after working with him. As a result, I left for college with a positive outlook on life, and I changed my major from engineering to speech-language pathology.

During the past 30 years, I have worked as a public school speech-language clinician, a researcher, and a university professor. I look ahead with anticipation to teaching the next generation of speech-language pathologists and conducting

(continues)

(continued)

research that could have a positive impact on the lives of children with communication disorders. Dr. Aten died this past year. His research and his clinical work have improved the lives of adults with aphasia and individuals who stutter. Thank you, Jim, for giving me hope at a time when I was really struggling with my speech, for empathizing with me, and for being a great role model of a productive, happy, and influential person who just happened to stutter.

Study Questions

1. How does a discipline differ from a profession?
2. A hallmark of the discipline of communication sciences and disorders is that it is based on sound scientific principles and research findings. What term do we use to describe how decisions professionals make about clinical service delivery are guided?
3. How did World War II affect communication sciences and disorders?
4. How can you differentiate between a communication disorder and a communication difference?
5. What are some common speech disorders in children or adults?
6. How can you differentiate between language delay, developmental language disorder, and acquired language disorder?
7. What are the different ways of regulating the professions of speech-language pathology and audiology?
8. What are the differences between certification and licensure?
9. What are the important functions of the American Speech-Language-Hearing Association?

Key Terms

Accreditation	Certification	Continuing education units
Acquired disorders	Communication	(CEUs)
Articulation and phonological disorders	Communication difference	Developmental disorders
Bilateral hearing loss	Communication disorder	Disability
Certificate of Clinical Competence (CCC)	Communication sciences and disorders (CSD)	Discipline
		Discrimination
		Ethics

Fluency disorder	Language	Phonatory disorders
Functional	Licensure	Prevalence
Handicap	Organic	Profession
Impairment	Otology	Resonance disorders
Incidence	Person-first language	Unilateral hearing loss

References

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: American Psychiatric Publishing.
- American Speech-Language-Hearing Association. (2000). *Communication facts*. Rockville, MD: Author.
- American Speech-Language-Hearing Association. (2014). *Code of ethics*. Retrieved from <http://www.asha.org/Code-of-Ethics/>
- American Speech-Language-Hearing Association. (2015a). *Highlights and trends: Member and affiliate counts, year-end 2013*. Retrieved from <http://www.asha.org/research/memberdata/>
- American Speech-Language-Hearing Association. (2015b). *Learn about the CSD professions: Speech-language pathology*. Retrieved from <http://www.asha.org/Students/Learn-About-the-CSD-Professions/>
- Bourgeois, M. S., & Hickey, E. M. (2009). *Dementia: From diagnosis to management—a functional approach*. New York, NY: Psychological Press.
- Centers for Disease Control and Prevention. (2013). *Summary of 2011 national EHDI data*. Retrieved from <http://cdc.gov/ncbddd/ehdi/data.htm>
- Dessy, A. M., Rasouli, J., & Choudhri, T. F. (2014). Second impact syndrome: A rare, devastating consequence of repetitive head injuries. *Neurosurgery Quarterly*. Advance online publication.
- Faul, M., Xu, L., Wald, M. M., & Coronado, V. G. (2010). *Traumatic brain injury in the United States: Emergency department visits, hospitalizations and deaths 2002–2006*. Atlanta, GA: Centers for Disease Control and Prevention, National Center for Injury Prevention and Control.
- Hebert, L. E., Scherr, P. A., Bienias, J. L., Bennett, D. A., & Evans, D. A. (2003). Alzheimer disease in the US population: Prevalence estimates using the 2000 census. *Archives of Neurology*, 60(8), 1119–1122.
- Hood, L. J. (1994). The American Academy of Audiology: Unifying and working for the profession of audiology. *Audiology Today*, 6(3), 15.
- Irwin, D., Pannbacker, M., Powell, M., & Vekovius, G. (2007). *Ethics for speech-language pathologists and audiologists: An illustrative casebook*. Austin, TX: Thomson Delmar.
- Johnson, C., & Seaton, J. (2012). *Educational audiology handbook* (2nd ed.). Boston, MA: Cengage.

- National Aphasia Organization. (2015). *Frequently asked questions*. Retrieved from <http://www.aphasia.org/aphasia-faqs/>
- National Institute of Neurological Disorders and Stroke. (n.d.). *NINDS aphasia information page*. Retrieved from <http://www.ninds.nih.gov/disorders/aphasia/aphasia.htm>
- National Institute on Deafness and Other Communication Disorders. (2015a). *Health information*. Retrieved from <http://www.nidcd.nih.gov/health/Pages/Default.aspx>
- National Institute on Deafness and Other Communication Disorders. (2015b). *Statistics on voice, speech and language*. Bethesda, MD: Author. Retrieved from <http://www.nidcd.nih.gov/health/statistics/Pages/vsl.aspx>
- Nelson, H., Bougatsos, C., & Nygren, N. (2008). Universal newborn hearing screening: Systematic review to update the 2001 U.S. Preventive Services Task Force recommendation. *Pediatrics*, 122, 266–276.
- Newby, H. (1958). *Audiology: Principles and practice*. New York, NY: Appleton-Century Crofts.
- Paul, R., Hernandez, R., Taylor, L., & Johnson, K. (1996). Narrative development in late talkers: Early school age. *Journal of Speech and Hearing Research*, 39, 1295–1303.
- Prince, M., Bryce, R., Albanese, E., Wimo, A., Ribeiro, W., & Ferri, C. P. (2013). The global prevalence of dementia: A systematic review and metaanalysis. *Alzheimer's Dementia*, 9(1), 63–75.
- World Health Organization. (2011). *World report on disability*. Geneva, Switzerland: Author. Retrieved from http://www.who.int/disabilities/world_report/2011/en/

Suggested Readings

- Martin, F. N., & Clark, J. G. (2006). *Introduction to audiology* (8th ed.). Needham Heights, MA: Allyn & Bacon.
- National Aphasia Association. <http://www.aphasia.org>
- National Institute of Neurological Disorders and Stroke. (n.d.). *NINDS aphasia information page*. Retrieved from <http://www.ninds.nih.gov/disorders/aphasia/aphasia.htm>
- National Student Speech Language Hearing Association. <http://www.nsslha.org/nsslha/>