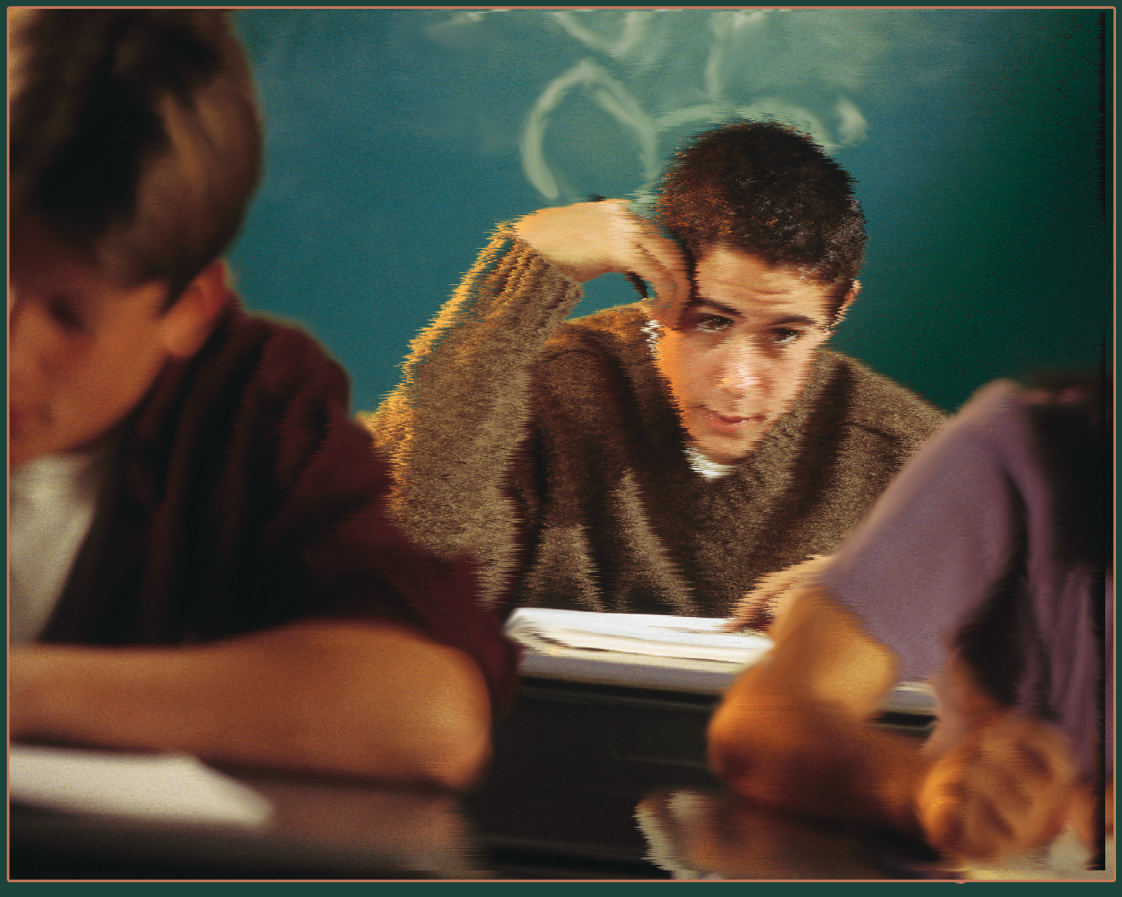
AUDITORY DISORDERS IN THE CLASSROOM

A Guide for Speech Language Pathologists, Audiologists and Educators



ALAN GERTNER, PhD

AUDITORY DISORDERS IN THE CLASSROOM

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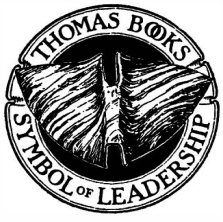
Edited by

ALAN GERTNER, PhD

(*With Six Other Contributors)*



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PREFACE

Humans are incredibly social animals but are not the fastest or strongest on earth. We have survived and flourished because of our remarkable ability to communicate. Coming together in civilizations and exchanging ideas enabled us to grow complex abstract languages as well as fields such as mathematics, chemistry, physics, and astronomy, which have propelled us to depths of the oceans and far reaching distances of space.

At the root of our development is hearing. It is through hearing that language develops and expands into higher order cognition. Neonates plunge into the world already immersed in sound experiences; so much so, they are familiar with their native language and recognize their mother's voices from all others. Studies have detailed that students spend up to 70 percent of the school day engaged in listening activities, and we know that how we hear is directly related to how we speak and to language competence.

I have participated for nearly 40 years with many school districts and school personnel in assessment and intervention of their students. Frequently, teachers, case managers, social workers, psychologists, and speech-language pathologists reach out to me for more detailed descriptions of children's conditions. They also request guidance in the best ways to approach and treat school children who experience academic or social challenges. My concern is that many more school professionals may have questions about instructing and managing children with auditory disorders.

The goal of this book is to provide school personnel with functional information that defines hearing disorders, outlines classroom conditions and barriers that impact children with hearing disorders, and details treatment strategies to help mitigate the detrimental effects of hearing disorders in the classroom. To this end, I have enlisted the aid of outstanding and talented professionals who are experts in key areas of speech and language, educational audiology, education of the deaf and hard of hearing, psychology, and educational law. Their chapters provide explicit information that can be used for direct assessment and treatment information or as a quick reference guide.

I am indebted to my selfless contributors; they have worked tirelessly and made personal sacrifices for this project. Reading their chapters has expanded my knowledge and has been a delight. I hope readers find the book professionally rewarding and helpful.

A.G.

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To paraphrase a well-known saying, it took a village to write this book. My enduring thanks are extended to my generous contributors: Mary Baumont, Ellen Hansen, Mary Kaland, Machid Namazi, Melissa Powers, and Nancy Schumann. Their commitment, dedication, and hard work are what propelled this project.

With thanks in order, my children Lauren, Rob, Rachel, Steve, Jaimee, and Doug and my grandchildren Jeffrey, Natalie, Caroline, and Dylan have provided to me unequivocal love and devotion. They are an incredibly caring, loyal, supportive, and accepting family and make, for me, all things possible. They are my life-blood as is my wife, Denise. She is the driving force in my life. She is my foundation as well as my finishing touches and knows me better than I know myself. Denise has always supported, championed, and been patient with me. She not only made this book possible, she makes my life possible. I can do nothing without you and love you more today than when we married. I thank your endless love, constant encouragement, and total commitment. If it takes forever I will wait for you!

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Chapter One

INTRODUCTION TO HEARING AND AUDITORY DISORDERS

Alan Gertner

Children with auditory disorders are denied access to speech and other sounds arising from their teachers, classmates, and classroom/school environments. For students engaged in learning, auditory deficits can be devastating to their language, academic, and psychosocial development. Adults have sophisticated language, cognitive skills, and world knowledge, which have been well developed through their myriad experiences. As a result, they are capable of "filling in" missing speech information and often "figure out" parts of messages (speech sounds or words) that auditory deficits may prevent them from receiving. Children, however, are far more susceptible to auditory system problems. As described by Delage and Tuller (2007),

> . . . even mild to moderate hearing losses have considerable negative consequences for children because of their developmentally reduced vocabulary, constraints related to limited language experience, lack of comprehensive daily working schema, incomplete auditory system development, and overall immature linguistic analyzing framework.

Children's hearing deficits initially take their toll on speech and language perception. Hearing disorders, however, lead to cascading negative effects that impact multiple areas of language development and linguistic competency including fluent reading, reading comprehension, and writing. Hearing spoken language may be considered the first phase of language learning and language competence. Once

language has been heard, morphologic, syntactic, semantic, and pragmatic rules begin to map onto a child's language system. These language competencies form the foundation for the second phase of language development—spoken language. Verbal language, in turn, expands into the third phase, which is reading language. The fourth phase of thriving language development is writing language. Auditory disorders interrupt and interfere with children's language, learning, and school performance from the beginning of their language development throughout their educational experience. It is not surprising that children who suffer with disruption of their auditory systems often have collateral problems in their speech, reading, and writing—the foundations of academic success.

In addition to the immediacy of speech and language problems experienced by children with hearing and listening problems, children with auditory system deficits may suffer further by falling between academic cracks. If their auditory conditions go undetected and untreated for long periods of time, their disorders may go undiscovered. This occurs because there are a myriad of language constraints and reiterations that facilitate communication abilities and may camouflage language comprehension deficiencies. Students gain literal, figurative, and emotional information from contextual, situational, and visual cues by taking advantage of naturally built-in language redundancies. Language redundancies address the presentation of ideas in multiple ways, which increase positive comprehension and successful communication. Language requires *agreement,* the concept that words in phrases and sentences relate to one another in specific ways. In American English, the sentence, "His car is bright red," has linguistic redundancies. "His car is" uses the singular possessive case. It would be incorrect to say, His car are bright red or Their car are bright red. Children with hearing disorders, as a result of benefiting from language redundancies, may function adequately in familiar and predictable communication situations due to benefits of situational and linguistic redundancies. Redundancies of new material and more complex language forms may not be as readily recognized by children with limited auditory and language facilities. Their lack of supportive clues often compounds communication and overwhelms hearing disordered children's capabilities, preventing their comprehension of less predictable spoken language. Teacher's and specials should appreciate that in classroom learning settings, children with hearing problems

may appear to comprehend language, but they may be guessing at or even pretending to understand sentence messages. In reality, they may not have comprehensive understanding of spoken words. Educational personnel must guard against being mislead when interacting with children who appear to be poor listeners, seem inattentive, low performing, or demonstrate behavioral problems. Children with these symptoms may be reacting and responding to partially received information. Their apparent comprehension of spoken language may be, in fact, a superficial and cursory reception resulting in reduced conception and weak assimilation of content.

Appreciating classroom needs of children with auditory disorders requires educational professionals to understand human hearing, disorders of the hearing system, language and learning complications imposed by auditory disorders, and available methods to intervene and successfully teach children with auditory deficits. The following chapters will detail these topics and provide speech and hearing specialists and educational professionals the academic tools necessary to manage the instructional needs of children with auditory disorders; either peripheral hearing loss or auditory processing disorders.

BACKGROUND

Hearing, like vision, is a distance sense. Our auditory systems reach out maintaining contact with and awareness of the world around us. Unlike vision, however, hearing is not line-of-sight. Walls, billboards, trees, or buildings obstruct and disconnect visual contact. Hearing, however, is immune to visual obstructions. In rooms without windows, we continue hearing people speaking outside. From within our homes, we are able to hear traffic, birds, and garbage trucks not readily visible. Hearing essentially expands our world, keeping us in touch with that which we cannot see. Even our very sense of reality is shaped by auditory input. Not only are we apprised of the larger world by hearing sounds from objects outside our senses of vision, olfaction, touch, and taste; subtle awareness of our environment is conveyed by situational noises. Hospitals sound differently than sports stadiums and schools have different acoustics than shopping malls. Hearing footsteps behind when walking down a dark street causes slight anxiety and forces us to peer over our shoulders.

Hearing is also an infant's gateway to security and social adjustment. In a matter of weeks, babies who have awakened and begun crying quickly calm when hearing steps approach their rooms. The sound of mother's voice or a melody emanating from an infant-bouncer soothes a disquieted infant. Importantly, as already discussed, language development and learning are directly related to intact hearing. Newborns, as a consequence of exposure to speech while in the womb, are capable of recognizing their native languages and distinguish their mothers' voices from others (Mehler et al., 1988; DeCasper & Fifer, 1980). Through auditory experience, within the first four to six months of life, phonemic organization (learning and organizing the sounds of one's native language) and recognition of one's own name begin (Mandel et al., 1995; Kuhl et al., 1992). Hearing then is critical for orientation to the world and provides the avenue through which speech, language, and life-long learning develop.

HOW THE HEARING MECHANISM WORKS

The hearing system is typically divided into three parts: outer, middle, and inner ears. Once sound has traversed these auditory anatomical structures, sound messages ascend the auditory nervous system via the fourth part of the hearing architecture, the central auditory pathways, and are eventually interpreted by the brain.

The outer ear consists of the auricle or pinna, visible structure on the sides of our heads that continue as the ear canal and end at the tympanic membrane (TM). The outer ear purpose is threefold: (1) to funnel sound toward the TM, (2) to recess the middle ear for protection, and (3) through resonance due to the peaks and valleys of the auricle, the outer ear enhances high frequency speech sounds like /s/, /t/, and /f/, which leads to improved speech perception. This latter purpose is referred to as "external ear effects" (Gertner and Schraer-Joiner, 2015) and serves to form the initial contributions to speech perception.

The middle ear, a cavity beyond the TM, houses the three smallest human bones, the malleus, incus, and stapes, which are commonly referred to as hammer, anvil, and stirrup. The purpose of these small bones is to transfer sound vibrations that have impinged on the TM across the middle ear space to our inner ears. Another important