A Guidebook for the Auditory Perception Test for the Hearing Impaired

From Assessment to Intervention
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From Assessment to Intervention

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We are witness to tremendous development and a unique time in the lives of families who have a child who is deaf or hard of hearing. Due to this “changing landscape of deafness,” the opportunities and demonstrated outcomes for these children have never been more impressive. With over 95% of babies being screened in the United States for hearing difference at birth, the early detection and identification of hearing loss in the first weeks and months of life, followed by the provision of earmolds and advanced hearing aids—the sky is the limit for our children. And, as necessary, the option of unilateral or bilateral cochlear implants and use of other hearing assistive technology—these infants, toddlers, preschoolers, and beyond—are destined for “greatness.” And with this early auditory foundation, clinically effective early intervention from practitioners who can guide and coach parents and other family members how to best teach their child—greatness can truly be achieved.

With all of the above and the fact that approximately 80% of children with hearing differences are being placed in the educational mainstream, the time is ripe for the introduction of the third edition of the Auditory Perception Test for the Hearing Impaired (APT/HI). The launch of this timely and focused guidebook, A Guidebook for the Auditory Perception Test for the Hearing Impaired: From Assessment to Intervention, comes at just the right time for professionals and parents—readers—to benefit from the many riches of this work.

Editor Susan G. Allen has assembled a roster of distinguished clinicians and other educators, who have tackled a variety of topics to support clinicians using the APT/HI (3rd ed.). Students and practitioners in the fields of speech-language pathology, audiology, and education of the deaf/hearing impaired often are in need of additional “coaching” in the multitude of issues related to this unique group of youngsters and students. The Guidebook valiantly serves that role. Using the commonly cited model of Erber’s auditory “hierarchy”—the varied levels of auditory functioning are robustly explained and developed, such that the most clinically effective services can be provided.

In our evolution of more and more families electing a listening and spoken language outcome for their child with hearing impairment, we are enriched by this guidebook and the authors’ hopes and expectations, that more and more children who are deaf or hard of hearing, can indeed learn to listen, and in so doing, develop intelligible speech; impressive language in the areas of form, content, and use; and notably, become “casual” and “typical” listeners. We have come so far—and this resource is a significant contribution so that we all might move even more forward.

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For his support of my work with children who are deaf or hard of hearing for the past 50 years, thanks to Gilman B. Allen, Jr., my husband, and to Dr. Thomas S. Serwatka, coauthor of the original APT/HI. I also would like to thank all of the clinicians and teachers across the country who have used APT/HI and who have provided valuable feedback (e.g., Dr. Linda Rosa Lugo, Alisa Demico, Meg Mapes Visconti, Dr. Christina Perigoe, and Dr. Todd Houston), and especially all of the authors who contributed their knowledge, experience, expertise, and passion to this project and to children with hearing loss and their families. I also would like to thank Lisa Tripi, my assistant to the director for several years at Clarke in Jacksonville, for the help and support she gave to me, the children, and their families.
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The APT/HI test and guidebook are dedicated to all of the children and adults with hearing loss and their families who have enriched my life and taught me so much in my 50-year career, and to all of the children and adults featured in the APT/HI test and guidebook. The publication is also dedicated to all children with hearing loss, their families, and the practitioners who will impact the children's listening and talking future lives.
CHAPTER 1

APT/HI Assessment to Intervention

Susan G. Allen

INTRODUCTION

A Guidebook for the Auditory Perception Test for the Hearing Impaired: From Assessment to Intervention, was written to be a companion publication to the newly revised assessment test, Auditory Perception Test for the Hearing Impaired (APT/HI), Third Edition (Allen, 2015). The goal of the companion guidebook is to provide practitioners with a step-by-step process in interpreting and using the APT/HI results to design an appropriate intervention plan. To date, there doesn’t appear to be another publication that provides a “comprehensive functional auditory assessment” (Perigoe & Paterson, 2013) and an accompanying guidebook to intervention of children with hearing loss, with specific attention to children who are late starters.

Why Should Practitioners Know About Functional Auditory Assessment and Intervention?

Newborn hearing screenings, earlier identification of hearing loss, and modern technology have all made it possible for children, even with profound hearing losses, to have significantly improved access to sound. Improved access to sound is paramount to achieving maximum outcomes as long as practitioners have the fund of knowledge that is necessary to assess functional auditory skills, interpret results, and develop listening and language management plans.

Practitioners working with children with hearing loss include speech-language pathologists (SLPs), audiologists, teachers of the deaf and hard-of-hearing, auditory-verbal therapists and auditory-verbal educators (LSLS, Listening and Spoken Language Specialists), early interventionists, staffing specialists, and other support personnel responsible for children with hearing loss.

Although well educated in university programs, practitioners often do not get the specific preparation training in functional auditory assessment and intervention. For example, with one population of practitioners, survey studies have shown that school-based SLPs have limited knowledge and skills in working with children with cochlear implants (Cosby, 2009; Nunez & Chute, 2003) and SLPs in general have limited knowledge in assessment of children with hearing loss, especially with cochlear implants (Compton, Tucker, & Flynn, 2009; Houston & Perigoe, 2010; Wray & Flexer, 2010). Despite having
limited knowledge and training, practitioners still have a responsibility to assess auditory, speech, and language skills to determine appropriate intervention and Individual Educational Planning goals for children with hearing loss (Rosa-Lugo & Allen, 2011). Even the skilled practitioners need to have specific information regarding mastered, emerging, and missing discrete auditory skills to plan appropriately.

Why Should Practitioners Know About Auditory Perception and Speech Production?

Maximum use of the auditory channel is critical for optimal listening and spoken language (LSL) outcomes. Listening drives speech production, language literacy, academics, and life-long learning (Allen, 2003). Professionals involved in auditory verbal education, therapy, and support services for children who are deaf or hard-of-hearing should be familiar with the increasing body of research that links listening and spoken language to speech intelligibility and literacy (Moeller, Tomblin, Yoshinaga-Itano, Conner, & Jerger, 2007; Nicholas & Geers, 2006; Sininger, Grimes, & Christensen, 2010). Furthermore, “…there is substantial evidence that ‘hearing’ (auditory brain development) is the most effective modality for the teaching of spoken language (speech), literacy and other cognitive skills” (Flexer, 2009, p. 44). The process of learning to listen and develop intelligible speech is accelerated by an optimal auditory signal for processing in the brain (Allen, 2003; Cole & Flexer, 2007; Estabrooks, 2006; Ling, 1976). Scholars have recognized that speech perception is inextricably linked with the production of intelligible speech, (O’Donoghue, Nikolopoulos, Archbold, & Tait, 1999). The process of perceiving the auditory signal, and processing the signal in the brain facilitates the production of speech and spoken language. This has often been described by Allen (2003), as the “3 P’s”: Perceive, Process, and Produce. Perception is the ability to hear the auditory signal; processing is an occurrence in the brain in which understanding of speech and spoken language occurs; and production is the planning, organization, and production of speech sounds, speech, and language.

To facilitate the 3 P’s it is critical that professionals go beyond the audiogram, which is often used to determine the current level of auditory function in a child with hearing loss. Practitioners need to know what the child with hearing loss can do with appropriate amplification in actual real-life situations (e.g., therapy, classroom). The APT/HI provides the practitioner with information about the auditory perception skills of a child with hearing loss and whether the discrete skills are mastered, emerging, and/or missing.

The Auditory Perception Test for the Hearing Impaired, APT/HI

The APT/HI assessment is a criterion-referenced assessment test that can be used as a tool to guide intervention with individuals with hearing loss ranging from mild to profound. Criterion-referenced tests are primarily used due to a lack of current normed data on children with hearing loss (Perigoe & Paterson, 2013). The primary goal of the test, APT/HI, is to assess discrete auditory skills that are necessary to decode spoken language. These discrete auditory skills require the individual with hearing loss to perceive sounds and language.
in order to process the information in the brain and ultimately produce speech and language structures. The APT/HI may be administered to children ages 3 and up; however, based on experience, it can be administered to children younger than 3 if the child has scanning, pointing, and responding abilities that are also required for other tests such as the Peabody Test of Vocabulary (Dunn & Dunn, 1997, 2007), and the Preschool Language Scale (Zimmerman, Steiner, & Pond, 2002, 2011).

The APT/HI contains test items that assess eight different skill areas ranging from awareness to open-set comprehension. There are 50 subskills within the eight different areas that allow the practitioner to identify specific auditory perception strengths and processing deficits across the continuum of listening (Erber, 1982; Walker, 2009).

The eight major skill areas are:

1. Auditory Awareness Tasks
2. Suprasegmental Aspects: DIP
   a. Duration
   b. Intensity
   c. Pitch
3. Prosodic Perception Tasks
4. Vowel Perception Tasks
5. Consonant Perception Tasks (manner, voicing, place)
6. Other Segmental Perception Tasks
7. Linguistic Perception Tasks
8. Communicative Comprehension Tasks

Auditory Awareness of Nonspeech and Speech Sounds

The first skill area is awareness, also known as detection. Auditory awareness of nonspeech, speech sounds, and identifying the number of beats in a speech sound is the foundation for building additional discrete auditory skills. For example, an analogy will demonstrate this concept: shutters can’t be put on a house before building the foundation for the house. Likewise, to be successful in learning to listen, one must have a basic foundation of auditory awareness in order to develop higher level discrimination, identification, and comprehension skills.

Suprasegmental Aspects of Speech and Language (DIP)

The second skill area is suprasegmental aspects of speech and language (i.e., duration, intensity and pitch, DIP). Along with other aspects (e.g., rate and juncture) suprasegmentals relay meaning to language by accenting words and by providing the prosodic features to speech, thereby increasing the intent of the message. For example: Maddie wants a ball versus Maddie wants a BALL relay different meanings.

Prosodic Perception

The third skill area is prosodic perception. How a child uses prosodic information (i.e., perceives, processes, and produces prosodic features) is necessary to identify words, phrases, and sentences.

Vowel Perception

The fourth skill area is vowel perception. Vowels are basic to identification of differing words. The first three basic vowels (Ling, 1976) are presented in isolation and are considered the foundation for identifying differing vowels and diphthongs that are presented in words.
Consonant Perception

The fifth skill area is consonant perception. Consonants relay the most information for word discrimination and identification. This section assesses the use of the 3 P’s with the consonant features of manner, voice, and place in the initial position in words. There are eight subset skills in this section.

Other Segmental Aspects of Speech and Language

The sixth skill area is other segmental aspects of speech and language. There are nine subset skills assessing the child’s (or adult’s) ability to identify words ending in different phonemes and blends, to identify a phoneme in different phonemic environments, with both maximum and minimum differences in words and phrases.

Linguistic Perception

The seventh skill area is linguistic perception. This area assesses how well a child can repeat sentences verbatim with a picture stimulus. The ability to “track” language verbatim is critical for comprehension. This is a skill that is tested in many language tests (e.g., PLS, APAT, TAPS-3).

Communication Comprehension

The eighth and final skill is communication comprehension. In both the trial and test presentations the child is asked questions designed for the child’s language level. Questions are presented without a picture stimulus to support the question; thus, the questions are open-set with no topic provided.

Why are these assessment areas and skills important? Each area consists of auditory components that interrelate and provide the building blocks for decoding English vocabulary and language structures but are not necessarily hierarchical (Flexer, 2005); and they are necessary for perceiving, processing, and producing language (Allen, 2003). For example, the information that is obtained from the subtest, OS4, Identification of a Phoneme in Different Phonemic Environments /m/, is a specific analysis task of the child’s ability to decode phonemes in the initial, medial, and final position in words (Allen, 2008). It is important to perceive and encode phonemes, which have been suggested to influence organization and arrangement of words in lexicon, and possible morphology and syntax (Pisoni, 2000). The eight areas with 50 subset skills evaluate the child’s use of the 3 P’s from awareness to open-set comprehension.

The APT/HI Assessment (Allen, 2015) has been revised. Although the APT/HI test plate book has not been revised since 2008, the manual of the APT/HI has been revised significantly. The manual provides information on the reliability and validation of the initial APT/HI test, additional research, and expanded content information for the practitioner using the APT/HI. The expanded manual provides additional information on content, training, and interpretation, including examples of real-life profiles and intervention techniques. Also included is an Early Listening Basic Skills Assessment with a user-friendly form for children.
having difficulty connecting to sound or having difficulty making a transition from a visual preference to an auditory mode for learning. An accompanying Activity Guide provides examples for the development and expansion of skills beyond those tested in the assessment tool.

The APT/HI assessment serves as an evaluation, habilitation, and rehabilitation training tool and as a programming guide to develop methods and specific strategies in planning an effective auditory management plan. Assessment of current functional skills, regardless of the discipline, is the basis for setting long-term and short-term goals (Perigoe & Paterson, 2013). Functional listening assessment is intended for children with hearing loss who progress following a normal developmental pattern and for children who are delayed in listening and speaking. In addition, the APT/HI is more than merely a one-time test to determine auditory perception abilities in individuals with hearing loss. When the APT/HI is administered over time (it is recommended to be administered after every 6 months of intervention), the results of the test provide the practitioner with information on areas of mastery and areas that need more attention. Results are assessed in the auditory-only mode and auditory visual mode, as appropriate.

The purpose of the companion guidebook to the APT/HI is to provide guidelines and recommendations on how to use the assessment outcomes that were obtained in the administration of the APT/HI, to set goals and develop an individualized and effective intervention plan for children with hearing loss. The intent of the guidebook is to increase the practitioners’ knowledge, skills, and competencies in their work with children with hearing loss and their families who desire LSL outcomes. The guidebook addresses six of the nine LSLS Domains of Knowledge Core Competencies: 2 (Auditory Functioning), 3 (Spoken Language Communication), 5 (Parent Guidance, Education, and Support), 6 (Strategies for Listening and Spoken Language Development), 8 (Education), and 9 (Emergent Literacy) with a focus on auditory functioning and intervention strategies (A.G. Bell Academy, 2012).

Many videos are available on the companion website for demonstration of key points and intervention techniques. Be aware that a couple of techniques that were widely accepted as best practices then may no longer be recommended, especially for children developing normally (e.g., the “hand cue” and partially covering your mouth with your hand or a screen to avoid speech reading). Instead, Warren Estabrooks recommends appropriate positioning of the child and the “Warren Schema” of “leaning into the child and waiting” (Estabrooks, 2015).

Contents of the Guidebook

Chapter 1, APT/HI Assessment to Intervention, is authored by Susan G. Allen. This chapter provides: an introduction; a brief description of the APT/HI Assessment; revisions that were made to the APT/HI assessment manual, new additions to the APT/HI, a description of the chapters of the Guidebook, and the benefit of using both the assessment and the guidebook.
Chapter 2, Understanding Speech Perception for the Development of Spoken Language, authored by K. Todd Houston, presents an in-depth understanding of speech perception and the development of phonemic and phonological awareness, which is necessary for the ultimate goal of competence in speech and literacy. The chapter provides an overview of hearing and speech science concepts that support auditory learning and spoken language in children with hearing loss. It is essential for the practitioner to have this basic fund of knowledge in order to understand and develop a child’s auditory listening abilities.

Chapter 3, Foundation for Listening, authored by Susan G. Allen, provides an understanding of how a child learns to listen by mastering the stages of detection, discrimination, identification, and comprehension (Erber, 1982). A framework is discussed linking auditory development with spoken language acquisition (perception leads to processing and then production). Using APT/HI as a starting point, the chapter ties together speech perception, speech acoustics, and speech production while offering practical strategies to facilitate intelligible spoken language. Four case studies are profiled: a child who learned through a developmental approach, a child who had a “bump in the road” during the development of listening and speaking, a late intervention child requiring significant remedial instruction, and a child whose first language was sign. Case studies are supported by media (PowerPoint and video demonstrations).

Chapter 4, Early Intervention, authored by Alisa Demico, describes how the APT/HI can be used in the assessment of young children and how to use the information from the APT/HI to determine appropriate intervention. Two case studies detail data collection, parent instruction, and intervention with sample videos to support the information presented.

Chapter 5, APT/HI and Literacy: Practical Applications for the Kindergarten and First Grade Child, authored by Cynthia Robinson, presents three case studies of children, ages 5 to 8, and discusses how the APT/HI results are used from assessment to intervention. The chapter outlines how individual, discrete skills on the APT/HI assessment relate directly to the development of all aspects of literacy. The chapter also provides strategies for improving phonemic awareness, using phonics, and building knowledge of vocabulary and language structures to improve comprehension, along with video demonstrations.

Chapter 6, Assessment and Intervention for the Older School Child, is authored by Linda I. Rosa-Lugo, Judy Horvath, Melissa Pyzak, and Kelly S. Teegardin. The chapter addresses the use of the Auditory Perception Test for the Hearing Impaired, APT/HI, from the perspective of practitioners who are speech-language pathologists and/or teachers with specialized preparation to work with children with hearing loss. Many school-age children with hearing loss enter the mainstream setting at some point in their auditory, speech, and oral language (LSL) development. Often children are mainstreamed before they have the LSL skills commensurate with their hearing peers and, consequently, are challenged by the curriculum. Case studies of late-identified children, with different levels of hearing and LSL skills, will be incorporated into the chapter to demonstrate their use of the APT/HI with children with differing needs.

Chapter 7, Special Case Studies, is authored by Susan G. Allen and Linda Daniel. Susan G. Allen presents four different case studies with accompanying
videos and PowerPoints in this chapter. The four children discussed in this chapter include children who have not learned to listen developmentally, received inappropriate or late intervention, and children with additional issues. The first child was implanted early but did not receive appropriate intervention; this child inspired this author to found Clarke Jacksonville in 1996 (now known as Clarke Schools for Hearing and Speech-Jacksonville, one of five campuses). The second child diagnosed with a hearing loss who had additional disabilities was not appropriately assessed and diagnosed until the age of 5½. The third child has a hearing loss with accompanying challenges that affect progress (Note: 40% of all children with hearing loss have additional disabilities); and, the fourth child was the first child to receive an Auditory Brainstem Implant and be educated in the United States. The chapter emphasizes the use of the APT/HI and how its use can assist practitioners in assessing the level at which the child is functioning and how to chart an appropriate intervention and educational plan designed to meet the child’s unique learning style.

Linda Daniel, certified auditory-verbal therapist, presents three case studies. The first is an adult implanted with a cochlear implant in 2014. The second is a child implanted with an ABI, auditory brainstem implant in 2014, and the third is a late intervention child with cochlear deficiency.

Chapter 8, APT/HI and Children Who Are English as Second Language (ESL) Learners, authored by Linda I. Rosa Lugo, discusses a growing population in practitioners’ caseloads in the United States. This chapter addresses the families and children where English is not the language used most often in the home. The use of the APT/HI to acquire baseline information, the use of specific strategies working with these children and families, and a case study is profiled with the goal of providing a better understanding of conducting appropriate assessment and designing culturally responsive intervention programs that integrate our knowledge of children with hearing losses and children who come from homes where English is not the language most often used in the home.

Chapter 9, Training Personnel in Functional Auditory Assessment, is authored by Christina Barris Perigoe and Marietta M. Paterson. Practitioners need to be skilled in both assessment and intervention with children who are deaf or hard of hearing—particularly in the areas of developing listening and spoken language. They need to understand the use of formal and informal assessments for auditory and speech perception and be able to select a protocol that is appropriate for each child’s age and stage of development.

Functional auditory assessment of children with hearing loss is addressed, including the role of the APT/HI as part of a comprehensive listening assessment for establishing the child’s current level of functional performance and charting the child’s progress. A case study demonstrates how the APT/HI can be used as part of a battery of tests in functional auditory assessment.

Chapter 10, Putting It All Together, authored by Susan G. Allen, summarizes the key points in the book and presents additional information: an historical development of APT/HI and accompanying tools; four actual cases of interpreting profile results and setting goals by four Clarke Jacksonville speech-language pathologists, fifteen intervention tips for treatment with accompanying videos, further research with two articles on reliability, and concluding comments by the author.