

## **Auditory Development**

Fundamental appreciation of normal auditory processing is needed for the clinician to knowledgably undertake the timely management of infants and young children with hearing loss. The three chapters (the first, the Conference's Keynote Address) comprising Section I – Auditory Development, provide the foundation for the contributions that follow in this volume.

As clinicians, it is important to consider the underlying physiology of the normal auditory system that performs the exquisite processing of sound that is the basis for auditory perception. Peripheral hearing loss alters these fundamental processes and consequently, in a cascading effect, the representation of acoustic input at higher levels of the auditory pathway. Early experience with sound is also critical to these neural representations. The research that is presented by Robert Harrison in his chapter “Representing the Acoustic World within the Brain: Normal and Abnormal Development of Frequency Maps in the Auditory System” provides a state-of-the-art review of the current understanding of auditory physiology and the consequences of auditory deprivation in animal models and supports our efforts at early identification and intervention for infants and young children with hearing loss.

Binaural processing of sound by the auditory system underlies our perception of auditory space, and is requisite to our ability to localize sound and extract speech from noisy and reverberant backgrounds. In her chapter “Development of Binaural Audition and Predictions for Real-World Environments,” Ruth Litovsky describes research on the binaural abilities in infants who hear normally; specifically, their abilities to localize sound and separate speech from competition. Work in developmental psychoacoustics that studies infants with normal hearing provides a foundation for our interventions with infants who have hearing loss. Although work remains to be done with infants who have hearing loss, clinicians should appreciate the research on binaural abilities of typically hearing infants.

Finally, Robert Nozza ties the laboratory studies of developmental psychoacousticians to the daily clinical activities of pediatric audiologists. His chapter “Developmental Psychoacoustics: Science to Practice” provides an evidence base for the behavioral audiological assessments that clinicians perform routinely. The chapter reviews research on normal auditory sensitivity and the contribution of non-sensory factors to the estimation of the hearing thresholds of infants, and laboratory methods that can result in reliable and accurate behavioral audiologic assessments of hearing sensitivity are discussed. Importantly, the chapter also reviews the work that has been completed on speech sound discrimination ability in infants who hear normally and with simulated hearing loss. Work in developmental psychoacoustics clearly can enhance the practice of clinical audiologists.

While readers may desire to move quickly to what are perceived as the ‘clinically relevant’ chapters, careful reading of Section I will provide many insights that can support and modify our assessment and intervention practices for the benefit of infants and young children with hearing loss.

This article was previously published in the Proceedings of the Second International Conference "A Sound Foundation Through Early Amplification" Sponsored by Phonak edited by Richard Seewald, Ph.D. and Judith Gravel, Ph.D. This article is reprinted here with permission from the author(s) and Phonak for educational purposes.

The Proceedings of the Second International Conference "A Sound Foundation Through Early Amplification" was originally produced by Immediate Proceedings, Ltd.

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