

Series Preface



The following preface is the one that we published in volume 1 of the Springer Handbook of Auditory Research back in 1992. As anyone reading the original preface, or the many users of the series, will note, we have far exceeded our original expectation of eight volumes. Indeed, with books published to date and those in the pipeline, we are now set for over 60 volumes in SHAR, and we are still open to new and exciting ideas for additional books.

We are very proud that there seems to be consensus, at least among our friends and colleagues, that SHAR has become an important and influential part of the auditory literature. While we have worked hard to develop and maintain the quality and value of SHAR, the real value of the books is very much because of the numerous authors who have given their time to write outstanding chapters and to our many co-editors who have provided the intellectual leadership to the individual volumes. We have worked with a remarkable and wonderful group of people, many of whom have become great personal friends of both of us. We also continue to work with a spectacular group of editors at Springer. Indeed, several of our past editors have moved on in the publishing world to become senior executives. To our delight, this includes the current president of Springer US, Dr. William Curtis.

But the truth is that the series would and could not be possible without the support of our families, and we want to take this opportunity to dedicate all of the SHAR books, past and future, to them. Our wives, Catherine Fay and Helen Popper, and our children, Michelle Popper Levit, Melissa Popper Levinsohn, Christian Fay, and Amanda Fay Seirra, have been immensely patient as we developed and worked on this series. We thank them and state, without doubt, that this series could not have happened without them. We also dedicate the future of SHAR to our next generation of (potential) auditory researchers—our grandchildren—Ethan and Sophie Levinsohn, Emma Levit, and Nathaniel, Evan, and Stella Fay.

Preface 1992

The Springer Handbook of Auditory Research presents a series of comprehensive and synthetic reviews of the fundamental topics in modern auditory research. The volumes are aimed at all individuals with interests in hearing research including advanced graduate students, post-doctoral researchers, and clinical investigators. The volumes are intended to introduce new investigators to important aspects of hearing science and to help established investigators to better understand the fundamental theories and data in fields of hearing that they may not normally follow closely.

Each volume presents a particular topic comprehensively, and each serves as a synthetic overview and guide to the literature. As such, the chapters present neither exhaustive data reviews nor original research that has not yet appeared in peer-reviewed journals. The volumes focus on topics that have developed a solid data and conceptual foundation rather than on those for which a literature is only beginning to develop. New research areas will be covered on a timely basis in the series as they begin to mature.

Each volume in the series consists of a few substantial chapters on a particular topic. In some cases, the topics will be ones of traditional interest for which there is a substantial body of data and theory, such as auditory neuroanatomy (Vol. 1) and neurophysiology (Vol. 2). Other volumes in the series deal with topics that have begun to mature more recently, such as development, plasticity, and computational models of neural processing. In many cases, the series editors are joined by a co-editor having special expertise in the topic of the volume.

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Volume Preface

The frequency-following response (FFR) is a measure of synchronous sound-evoked neural activity that reveals the integrity of sound processing in the brain. Studies of the FFR are organized around two intertwining themes that are reviewed in this volume: learning and everyday communication. These studies tie into a conceptual framework whereby making sense of sound is fundamental to everyday life and is at the intersection of cognitive, sensorimotor, and reward networks in the brain. Understanding how well an individual listener processes sound provides a snapshot of auditory function and its impact on everyday communication skills.

Chapter 1, by Nina Kraus, Samira Anderson, and Travis White-Schwoch, provides an overview of FFR research and contends that the FFR reflects an individual's past and potential in sound. The part of this volume devoted to learning starts in Chap. 2 where Jeng reviews how auditory experience early in life shapes auditory brain development, intertwined with a discussion of theories of early speech and language development. In Chap. 3, Krishnan and Gandour discuss how everyday linguistic experience shapes auditory processing, with an emphasis on the neural coding of pitch-bearing information. Following this, Carcagno and Plack (Chap. 4) provide a comprehensive review of FFR studies of short-term training and perceptual learning. Escera (Chap. 5) considers a different form of auditory plasticity—the ability to rapidly adapt to a sensory environment *online*. White-Schwoch and Kraus (Chap. 6) end the section on learning and bridge into the section on everyday communication. They review principles of auditory learning, emphasizing the enduring biological legacy that everyday experiences impart.

Shinn-Cunningham, Varghese, Wang, and Bharadwaj (Chap. 7) open the section on everyday communication by reviewing cutting-edge work that unravels biological processes that facilitate and constrain sound-directed attention. Following this, Bidelman (Chap. 8) discusses two insidious constraints on everyday communication: noise and reverberation. Schochat, Nunes Rocha-Muniz, and Filippini (Chap. 9) then tackle auditory processing disorder—poor auditory function despite normal audiograms—a clinical condition that continues to vex audiologists and scientists. Following this, Reetzke, Xie, and Chandrasekaran (Chap. 10) review the

extensive literature using the FFR to study reading impairments such as dyslexia. The volume ends with a discussion of clinical translation in the context of aging, hearing loss, and amplification by Anderson (Chap. 11).

Together, these chapters illustrate the diversity of research applying the FFR and the rich granularity of biological insight into auditory function that the FFR provides. The core theme that emerges is that human communication is intimately tied to experience with sound. These experiences range from in-the-moment adaptation to lifelong experience with language or music. These communicative skills extend into everyday life, including listening in noise, spatial hearing, and literacy. Interest in capitalizing in the communication–experience link motivates an eventual goal of using the FFR in clinical settings, to evaluate listening skills, predict future listening challenges, and reveal outcomes from interventions.

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The Frequency-Following Response

A Window into Human Communication

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