

Volume Preface

The topic of loudness is of considerable concern, both in and outside of research laboratories. Most people have developed an opinion about some aspect of loudness, and many complain about the loudness of background sounds in their daily environments and their impacts on quality of life. Moreover, such sounds interfere with the ability to hear useful sounds, and such masking can be especially problematic for people with hearing losses, children, older adults, and nonnative speakers of a language.

At the same time, not all loud sounds are undesirable. Some loud sounds are important for human well-being, such as warning signals, whereas other loud sounds, such as music, can be pleasurable. In fact, loudness is essential for enjoying the dynamics of music. Thus, loudness is a pervasive and complex issue, and one that needs to be examined from a wide range of perspectives, and that is the purpose of this volume.

Research in loudness has been performed in many countries, and this volume is an international endeavor with authors from Europe, Japan, and the United States, making the volume an attempt to provide a global network of information about loudness. The editors are very pleased to be able to bring together information on many aspects of loudness in this one volume, as well as to highlight approaches from many different perspectives.

The overall stage for understanding the issues of loudness is set up in Chapter 1 by Florentine, who defines loudness and provides an overview of the many factors that influence loudness, Chapter 1 also addresses how language and culture may influence loudness, and concludes with a summary of current knowledge of the physiological mechanisms involved in loudness. Chapters 2 and 3 cover issues related to the measurement of loudness. Marks and Florentine, in Chapter 2, discuss the theoretical, empirical, and practical constraints on loudness measurement. The chapter starts with a brief history of loudness measurement in the nineteenth and twentieth centuries, and ends with contemporary methods of measurements. Of course, measures of loudness are also influenced by the context in which sounds are heard. In Chapter 3, Arie and Marks discuss the ways in which context affects loudness and loudness judgments. In Chapter 4, Epstein reviews two issues related to responses to loudness: physiological effects of loud sounds, and perceptual and physiological data that correlate with loudness. Loudness in the laboratory is

discussed in Chapters 5 and 6 using a traditional, but artificial, classification to divide the subject matter. Jesteadt and Leibold address the loudness of steady-state sounds in Chapter 5. Kuwano and Namba examine the loudness of nonsteady-state (time-varying) sounds in Chapter 6.

The bridge between loudness in the laboratory and daily environments begins in Chapter 7 and is expanded upon in Chapter 8. In Chapter 7, Sivonen and Ellermeier review studies on binaural loudness that have used different modes of stimulus presentation: headphones and free, diffuse, and directional sound fields. They show how mode of presentation affects the measurement of binaural loudness. In Chapter 8, Fastl and Florentine cover how loudness is related to annoyance, music, multisensory (audio-visual and audio-tactile) interactions, and the environmental context in which sounds are heard. They also discuss issues related to setting sound levels to optimal loudness for large groups of people. The topic of loudness is especially important for the one out of ten people who have a hearing loss and for those doing work with some aspect of aural rehabilitation. Knowledge of loudness in hearing loss is also important for anyone trying to understand normal hearing, because it puts constraints on theories of loudness. In Chapter 9, Smeds and Leijon summarize current thinking on the formation of loudness as it relates to different types of hearing loss and they describe strategies used to compensate for altered loudness. The volume ends in Chapter 10 with an introduction to models of loudness by Marozeau.

As with most volumes in the *Springer Handbook of Auditory Research*, chapters often build upon material discussed in earlier volumes. In particular, generally related material can be found in Volumes 3 (*Human Psychophysics*), 6 (*Auditory Computation*), 18 (*Speech Processing in the Auditory System*), and 29 (*Auditory Perception of Sound Sources*).

The editors express their appreciation to a number of colleagues and friends, including the authors of the chapters, who assisted in review of one or more of the chapters. We are grateful to William J. Cavanaugh, Leo Beranek, Brian Fligor, Julia B. Florentine, Michael G. Heinz, Sharon Kujawa, Andrzej Miśkiewicz, Brian C. J. Moore, Andrew Oxenham, Torben Poulsen, Bertram Scharf, and the students of the 2009 Loudness Seminar at Northeastern University.

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Loudness

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2011, XIV, 290 p., Hardcover

ISBN: 978-1-4419-6711-4