

The Physics And Psychophysics Of Music An Introduction

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[By] Juan G. Roederer
The Psychophysical Ear
A Psychophysical Investigation of Complexity in Music
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Music The American Music Teacher Journal of the Audio Engineering Society The Psychophysical Ear *Juan G. Roederer Juan G. Roederer Juan G. Roederer Juan G. Roederer Juan G. Roederer Juan G. Roederer J.G. Roederer J.G. Roederer Diana Deutsch Juan Roederer Juan G. Roederer Alexandra Hui Joyce Kathryn Conley J.G. Roederer Diana Deutsch Manfred Clynes Diana Deutsch Audio Engineering Society Alexandra Hui*

this book uses acoustics psychophysics and neurobiology to explore the physical systems and biological processes that intervene when we hear music it incorporates the latest findings in brain science and tone generation in musical instruments

this book deals with the physical systems and physiological processes that intervene in music it analyzes what objective physical properties of sound are associated with what subjective psychological sensations of music and it describes how these sound patterns are actually generated in musical instruments how they propagate through the environment and how they are detected by the ear and interpreted in the brain using the precise language of science but without complicated mathematics the author weaves a close mesh of the physics psychophysics and physiology relevant to music a prior knowledge of physics mathematics physiology or psychology is not required to understand most of the book it is however assumed that the reader is familiar with music in particular with musical notation musical scales and intervals and some of the basics of musical instruments from publisher s description

viii book we shall refer a great deal to the discipline of psycho physics which in a broad sense tries to establish in a quantitative form the causal relationship between the physical input from our senses and the psychological sensations and physiological reactions evoked in our mind and body respectively actually we shall try to weave a rather close mesh between physics and psychophysics or more precisely psychoacoustics after all they appear naturally interwoven in music itself not only pitch loudness and timbre are a product of physical and psychoacoustical processes but so are the sensations related to consonance and dissonance tonic dominance trills and ornamentation vibrato phrasing beats tone attack duration and decay rhythm and so on many books on physics of music or

musical acoustics are readily available an up to date text is the treatise of john backus 1969 no book on psychoacoustics is available at the elementary level though several review articles on pertinent topics can be found in tobias 1970 and in plomp and smooenburg 1970 a comprehensive discussion is given in flanagan s book on speech 1972 and of course there is the classical treatise of von bekesy 1960 a comprehensive up to date analysis of general brain processes can be found in sommerhoff 1974 musical psychology is discussed in classical terms in lundin 1967

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the psychology of music serves as an introduction to an interdisciplinary field in psychology which focuses on the interpretation of music through mental function this interpretation leads to the characterization of music through perceiving remembering creating performing and responding to music in particular the book provides an overview of the perception of musical tones by discussing different sound characteristics like loudness pitch and timbre together with interaction between these attributes it also discusses the

effect of computer resources on the psychological study of music through computational modeling in this way models of pitch perception grouping and voice separation and harmonic analysis were developed the book further discusses musical development in social and emotional contexts and it presents ways that music training can enhance the singing ability of an individual the book can be used as a reference source for perceptual and cognitive psychologists neuroscientists and musicians it can also serve as a textbook for advanced courses in the psychological study of music encompasses the way the brain perceives remembers creates and performs music contributions from the top international researchers in perception and cognition of music designed for use as a textbook for advanced courses in psychology of music

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an examination of how the scientific study of sound sensation became increasingly intertwined with musical aesthetics in nineteenth

century germany and austria in the middle of the nineteenth century german and austrian concertgoers began to hear new rhythms and harmonies as non western musical ensembles began to make their way to european cities and classical music introduced new compositional trends at the same time leading physicists physiologists and psychologists were preoccupied with understanding the sensory perception of sound from a psychophysical perspective seeking a direct and measurable relationship between physical stimulation and physical sensation these scientists incorporated specific sounds into their experiments the musical sounds listened to by upper middle class liberal germans and austrians in the psychophysical ear alexandra hui examines this formative historical moment when the worlds of natural science and music coalesced around the psychophysics of sound sensation and new musical aesthetics were interwoven with new conceptions of sound and hearing hui a historian and a classically trained musician describes the network of scientists musicians music critics musicologists and composers involved in this redefinition of listening she identifies a source of tension for the psychophysicists the seeming irreconcilability between the idealist universalizing goals of their science and the increasingly undeniable historical and cultural contingency of musical aesthetics the convergence of the respective projects of the psychophysical study of sound sensation and the aesthetics of music was however fleeting by the beginning of the twentieth century with the professionalization of such fields as experimental psychology and ethnomusicology and the proliferation of new and different kinds of music the aesthetic dimension of psychophysics began to disappear

on interpreting musical phenomena in terms of mental function

an expanded version of the third workshop on the physical and neuropsychological foundations of music held in ossiach austria
august 8 12 1980

approx 542 pages

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