Startle Modification

The startle response (response to a loud noise, for instance) is a reflex that is wired into the brain at a very basic level. Although everyone has such a reflex, the strength and quickness of the startle response is modified by a subject's underlying psychoneurological state. The nature of this modification, therefore, is now seen as an accurate, objective measure of very deep neurological processes.

This book is the first comprehensive volume devoted to startle modification and offers a unique overview of the methods, measurement, physiology, and psychology of the phenomenon, particularly modification of the human startle eyeblink. Chapters are written by many of the world's leading investigators in the field and include coverage of elicitation and recording of the startle blink; issues in measurement and quantification; the neurophysiological basis of the basic startle response and its modification by attentional and affective processes; psychological processes underlying short and long lead interval modification (including prepulse inhibition); applications of startle modification to the study of psychopathology, including schizophrenia, affective disorders, and psychopathy; developmental processes; and relationships with event-related potentials and behavioral measures of information processing.

This book will be an invaluable reference for graduate students and researchers in cognitive science, clinical science, and neuroscience, including experimental psychologists, psychophysiologists, neuroscientists, biological psychiatrists, and clinical psychologists with research interests in psychopathology.

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Implications for Neuroscience, Cognitive Science, and Clinical Science

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To the people who fill our lives with love and make our work worthwhile

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Preface

This book is the first comprehensive volume devoted to startle modification, particularly modification of the human startle eyeblink reflex. As such, it offers a unique overview of the paradigms used to study startle modification, the methods used to measure and quantify startle modification, and the physiological and psychological processes mediating and moderating the phenomena of startle modification.

Why devote an entire book to a seemingly esoteric and narrow topic such as the modification of the startle reflex? The answer is that the study of startle modification is deceptive in its appearance of being narrow and esoteric. In fact, the study of startle modification offers the potential to expose and clarify a number of important issues across diverse areas of psychology, psychiatry, and neuroscience. The startle reflex and its modification are rich with implications for neuroscience, cognitive science, and clinical science; hence, the subtitle of this book.

Beyond having implications *for* several subareas of scientific inquiry, the study of startle modification has implications for the integration *across* these areas. Startle modification in its various forms may provide a powerful integrative research tool. It is a paradigm that can bridge the methods and concepts of neuroscience, cognitive science, and clinical science. The growing interest in this paradigm attests to the emerging sense of the important integrative nature of the study of startle modification.

For cross-disciplinary integration to occur, however, researchers in different disciplines with their different terminologies and different concepts need to communicate. That is one of the primary reasons for this book. We invited distinguished investigators doing research with startle modification in different disciplines to write about how startle modification can enlighten us in their specific disciplines. In this way we can begin to see what the study of startle modification has to offer within each discipline and how this information can lead to greater integration across disciplines.

Another reason for this book is to introduce the startle modification para-

digms and their immense possibilities to investigators of different disciplines who may be only vaguely familiar with them. This book will hopefully provide an introduction to those who want to learn more about the startle modification phenomena and who may be interested in adding it to their own investigation, as well as providing a thorough review for those already familiar with this versatile measure.

It is important to remember that this book is not about the startle reflex; rather, it is about *modification* of the startle reflex. That is, the focus of this book is on psychological and physiological processes initiated by nonstartling "lead stimuli" that influence subsequently elicited startle reactions. These processes include protective inhibition, sensorimotor gating, alertness and activation, attention and orienting, information processing, and affect processing in both normal and abnormal guises. The startle modification paradigms allow investigators to study the excitatory and inhibitory mechanisms underlying these processes, and to uncover their time courses, in both humans and lower animals. The startle modification paradigms permit the study of these processes and mechanisms with different lead stimuli at different times in different people. Thus, the "startle stimulus" is a convenient, nonverbal, involuntary, culture-free, and quantifiable probe of psychophysiological processes occurring at specified intervals following the "lead stimuli."

Finally, we express our great appreciation to Jonathan Wynn for his invaluable assistance with the many details necessary to put this book in its final form. Jonathan's considerable skills and good nature were put to the test with the compiling of the extensive integrated list of references, the organization of the final text and figures, and many other matters.