



Visual Psychophysics: From Laboratory to Theory (MIT Press)

By Zhong-Lin Lu, Barbara Dosher

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Vision is one of the most active areas in biomedical research, and visual psychophysical techniques are a foundational methodology for this research enterprise. Visual psychophysics, which studies the relationship between the physical world and human behavior, is a classical field of study that has widespread applications in modern vision science. Bridging the gap between theory and practice, this textbook provides a comprehensive treatment of visual psychophysics, teaching not only basic techniques but also sophisticated data analysis methodologies and theoretical approaches. It begins with practical information about setting up a vision lab and goes on to discuss the creation, manipulation, and display of visual images; timing and integration of displays with measurements of brain activities and other relevant techniques; experimental designs; estimation of behavioral functions; and examples of psychophysics in applied and clinical settings.

The book's treatment of experimental designs presents the most commonly used psychophysical paradigms, theory-driven psychophysical experiments, and the analysis of these procedures in a signal-detection theory framework. The book discusses the theoretical underpinnings of data analysis and scientific interpretation, presenting data analysis techniques that include model fitting, model comparison, and a general framework for optimized adaptive testing methods. It includes many sample programs in Matlab with functions from Psychtoolbox, a free toolbox for real-time experimental control. Once students and researchers have mastered the material in this book, they will have the skills to apply visual psychophysics to cutting-edge vision science.

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Editorial Review

Review

Visual Psychophysics provides a comprehensive, up-to-date set of tools for use in vision science. The essentials are all here, ranging from practical lessons in creating displays and implementing experiments to theoretical tools for analyzing data in the context of theories. Whether a beginning vision scientist or a seasoned researcher, you'll be glad to have this unique resource easily accessible on your bookshelf.

(Randolph Blake, Centennial Professor of Psychology, Vanderbilt University)

This is an excellent textbook from two key practitioners of visual psychophysics. This field has accumulated a body of practical knowledge that has been passed from advisor to student. This book puts it all together in a cogent manner. It also provides useful pieces of Matlab code, which will help students get up and running with their own experiments.

(Matteo Carandini, University College London)

Visual Psychophysics does an amazing job of putting deep and detailed information about psychophysical methods and principles in the hands of students and investigators. This is a handbook that any experimenter in the field of vision will find indispensable.

(Mary C. Potter, Professor of Psychology, Department of Brain and Cognitive Sciences, MIT)

About the Author

Zhong-Lin Lu is Distinguished Professor of Social and Behavioral Sciences, Professor of Psychology, and Director of the Center for Brain and Cognitive Sciences at The Ohio State University.

Barbara Dosher is Distinguished Professor of Cognitive Sciences and Dean of the School of Social Sciences at the University of California, Irvine.

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Brandy Greenawalt:

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