



An Introduction to the Event-Related Potential Technique (MIT Press)

By *Steven J. Luck*

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The event-related potential (ERP) technique, in which neural responses to specific events are extracted from the EEG, provides a powerful noninvasive tool for exploring the human brain. This volume describes practical methods for ERP research along with the underlying theoretical rationale. It offers researchers and students an essential guide to designing, conducting, and analyzing ERP experiments. This second edition has been completely updated, with additional material, new chapters, and more accessible explanations. Freely available supplementary material, including several online-only chapters, offer expanded or advanced treatment of selected topics. The first half of the book presents essential background information, describing the origins of ERPs, the nature of ERP components, and the design of ERP experiments. The second half of the book offers a detailed treatment of the main steps involved in conducting ERP experiments, covering such topics as recording the EEG, filtering the EEG and ERP waveforms, and quantifying amplitudes and latencies. Throughout, the emphasis is on rigorous experimental design and relatively simple analyses. New material in the second edition includes entire chapters devoted to components, artifacts, measuring amplitudes and latencies, and statistical analysis; updated coverage of recording technologies; concrete examples of experimental design; and many more figures. Online chapters cover such topics as overlap, localization, writing and reviewing ERP papers, and setting up and running an ERP lab.

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Editorial Review

Review

The quality of science always depends on careful experimentation. Learning from the authorities of the field is the most effective way of mastering a method. Steven Luck is the master of evoked responses and this second edition amply proves it.

(György Buzsáki, Biggs Professor of Neural Sciences, NYU Neuroscience Institute)

This expanded and updated edition of Steven Luck's book is essential reading for all who investigate the event-related brain activity that underlies human perception and cognition. True to its title, this new edition provides an authoritative and (even more) comprehensive introduction to the basic technical and theoretical principles of brain potential recording. Interwoven with these basics, moreover, are lucid discussions of more advanced (and even controversial) topics of experimental design, data analysis, and interpretation that will challenge and entertain investigators at all levels. An additional bonus comes from well-chosen overviews of recent studies that give an up-to-date picture of how brain potential recordings are shedding light on the neural architecture of cognitive processes such as attention, memory, and language.

(Steven A. Hillyard, Department of Neurosciences, University of California, San Diego)

This book is a must-read for students and researchers using ERPs in cognitive neuroscience. It should be in every ERP lab around the world. Doing great ERP research is an art, and requires insights into the signals acquired, filtering, artifacts, source reconstruction, and so on. Equally crucial is knowledge about the possibilities and limitations of ERPs. Based on Luck's years of experience in instructing students in his ERP Boot Camps, the book discusses all the intricate aspects of ERP research in an accessible and scholarly way. Therefore, I highly recommend *An Introduction to the Event-Related Potential Technique* to all who want to apply this method with maximal gain.

(Peter Hagoort, Director, Donders Institute for Brain, Cognition, and Behaviour; Director, Max Planck Institute for Psycholinguistics, Nijmegen, The Netherlands)

About the Author

Steven J. Luck is Professor of Psychology and Director of the Center for Mind and Brain at the University of California, Davis. A leading authority on ERP research, he leads ERP Boot Camps that provide ERP training to researchers from around the world.

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