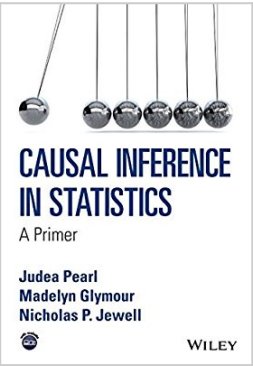

Causal Inference in Statistics: A Primer

By Judea Pearl, Madelyn Glymour, Nicholas P. Jewell

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Many of the concepts and terminology surrounding modern causal inference can be quite intimidating to the novice. Judea Pearl presents a book ideal for beginners in statistics, providing a comprehensive introduction to the field of causality. Examples from classical statistics are presented throughout to demonstrate the need for causality in resolving decision-making dilemmas posed by data. Causal methods are also compared to traditional statistical methods, whilst questions are provided at the end of each section to aid student learning.

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Editorial Review

Review

"Despite the fact that quite a few high-quality books on the topic of causal inference have recently been published, this book clearly fills an important gap: that of providing a simple and clear primer...Use of counterfactuals [in the final chapter] is elegantly linked to the structural causal models outlined in the previous chapters...[while]intriguing examples are used to introduce and illustrate the main concepts and methods...Several thought provoking study questions, in the form of exercises, are given throughout the presentation, and they can be very helpful for a better understanding of the material and looking further into the subtleties of the concepts introduced. In summary, there is no doubt that a discussion of the basic ideas in causal inference should be included in all introductory courses of statistics. This book could serve as a very useful companion to the lectures." (*Mathematical Reviews/MathSciNet* April 2017)

From the Back Cover

Causal Inference in Statistics: A Primer

Judea Pearl, Computer Science and Statistics, University of California Los Angeles, USA

Madelyn Glymour, Philosophy, Carnegie Mellon University, Pittsburgh, USA

and

Nicholas P. Jewell, Biostatistics, University of California, Berkeley, USA

Causality is central to the understanding and use of data. Without an understanding of cause effect relationships, we cannot use data to answer questions as basic as, “Does this treatment harm or help patients?” But though hundreds of introductory texts are available on statistical methods of data analysis, until now, no beginner-level book has been written about the exploding arsenal of methods that can tease causal information from data.

Causal Inference in Statistics fills that gap. Using simple examples and plain language, the book lays out how to define causal parameters; the assumptions necessary to estimate causal parameters in a variety of situations; how to express those assumptions mathematically; whether those assumptions have testable implications; how to predict the effects of interventions; and how to reason counterfactually. These are the foundational tools that any student of statistics needs to acquire in order to use statistical methods to answer causal questions of interest.

This book is accessible to anyone with an interest in interpreting data, from undergraduates, professors, researchers, or to the interested layperson. Examples are drawn from a wide variety of fields, including medicine, public policy, and law; a brief introduction to probability and statistics is provided for the uninitiated; and each chapter comes with study questions to reinforce the readers understanding.

About the Author

Judea Pearl is Professor of Computer Science and Statistics at the University of California, Los Angeles,

where he directs the Cognitive Systems Laboratory and conducts research in artificial intelligence, causal inference and philosophy of science. He is a Co-Founder and Editor of the *Journal of Causal Inference* and the author of three landmark books in inference-related areas. His latest book, *Causality: Models, Reasoning and Inference* (Cambridge, 2000, 2009), has introduced many of the methods used in modern causal analysis. It won the Lakatosh Award from the London School of Economics and is cited by more than 10,000 scientific publications.

Pearl is a member of the National Academy of Sciences, the National Academy of Engineering , and a Founding Fellow of the Association for Artificial Intelligence. He is a recipient of numerous prizes and awards, including the Technion's Harvey Prize and the ACM Alan Turing Award for fundamental contributions to probabilistic and causal reasoning.

Madelyn Glymour is a data analyst at Carnegie Mellon University, and a science writer and editor for the Cognitive Systems Laboratory at UCLA. Her interests lie in causal discovery and in the art of making complex concepts accessible to broad audiences.

Nicholas P. Jewell is Professor of Biostatistics and Statistics at the University of California, Berkeley. He has held various academic and administrative positions at Berkeley since his arrival in 1981, most notably serving as Vice Provost from 1994 to 2000. He has also held academic appointments at the University of Edinburgh, Oxford University, the London School of Hygiene and Tropical Medicine, and at the University of Kyoto. In 2007, he was a Fellow at the Rockefeller Foundation Bellagio Study Center in Italy.

Jewell is a Fellow of the American Statistical Association, the Institute of Mathematical Statistics, and the American Association for the Advancement of Science (AAAS). He is a past winner of the Snedecor Award and the Marvin Zelen Leadership Award in Statistical Science from Harvard University. He is currently the Editor of the *Journal of the American Statistical Association - Theory & Methods* , and Chair of the Statistics Section of AAAS. His research focuses on the application of statistical methods to infectious and chronic disease epidemiology, the assessment of drug safety, time-to-event analyses, and human rights.

Videos:

Introduction to Causality – Part I with Professors Judea Pearl and Nicholas P. Jewell

Teaching Causality – Part I with Professors Judea Pearl and Rob Gould

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