

## Book Reviews

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**Ann Rudinow Sætnan, Heidi Mork Lomell, and Svein Hammer.** *The Mutual Construction of Statistics and Society*. New York: Routledge, 2011. ISBN 978-0-415-87370-3, 278 pp, \$125.

This text examines the multiple aspects of how statistics delves into the foundations of society and issues related to public policy and governance. The work provides a battery of chapters that involves the usage of statistics in governance and social policies (such as education, health services, and policing) across a number of countries, including Norway, Sweden, Brazil, Canada, and the UK.

Stemming from Desrosières (1998), Porter (1986) and Hacking (1990), Sætnan et al.’s work brings a perspective to the issue of how statistics is a part of the structure of the society. Each section of the book is well-structured on a topic of interest from theoretical debates to policy applications in several social and political domains.

Beginning from the theoretical discourse in Part I, the authors nicely debate distinct approaches to the intersection of numbers and different domains of society. First, Hovland tackles how numbers and statistics are so important in organizations. His approach is certainly refreshing in exploring the ways through which statistics become a tool for power in organizations. This chapter presents four fundamental practices of numbers (standardization, quantification, modeling, and accountable communication) all of which are essential tools of governing.

Second, Desrosières provides an interesting historical perspective to the development of statistics in social sciences. The reasons behind random sampling, regression models and logistic regression models are strongly delineated. This chapter is distinctive in its multilateral approach to presenting how the discipline has evolved through the interaction of the state, the market, and statistics. It provides a broader perspective accounting for the role of major academics (such as Pearson, Kiær, and Yule) in the social sciences, defined as “an applied experimental science” (p. 54). The gist of Desrosières’ chapter relies on how the idea of covering “all classes of society” through representativeness of social statistics is essential to the understanding of social norms and differences.

Next, Kullenberg discusses the mediator role of statistics within Swedish social sciences through the Uppsala School of Sociology. Finally, Hammer provides an evaluation of statistics within the practices of governance from the Foucauldian perspective. In short, Part I sets up the theoretical basis for the following chapters on the usage of statistics within the social sciences and the institutions of the state.

In Part II, the chapters provide a detailed analysis of how group identities are generated through statistics. The theoretical application of the first section is particularly employed on the issue of ethnicity. To that end, Balka and Rodje properly assess the implications of measuring ethnicity in health services. The chapter elaborates on the measurement of ethnicity in Canada and discusses the potential problems that could arise because of using incorrect measurement tools. From these possible threats to the reliability and validity of the measures, the authors suggest that ethnicity-based explanations within health care cannot be causal but rather associational. The message of Balka and Rodje is that the health services should take into account certain differences across people and provide services on the basis of needs specific to the individual ethnic group, if of course there is scientific evidence that the ethnic groups do differ on their health needs.

Second, Schwatzman discusses a very important social dilemma in Brazil. The author's approach to the subject (albeit involving certain difficulties) is successful. The way the issue is unpacked is a scientific way to study racial consciousness and racial identity. In that the research is conducted with university students on racial quotas, it provides insights into an important public issue that also concerns long-term outcomes within education and the unemployment rates of certain racial groups. Although the sample of the students interviewed in this research is nonrandom, the in-depth interviews provide the participants' understanding of race, racial groups, and the racial quota law. As this is a sensitive and complex issue for the Brazilian public, it is essential to understand how people would ethnically identify. In that respect, this chapter provides a valuable discussion.

The final chapter in Part II by St. Clair provides a theoretical debate on human development and capability as the two intellectual boundary objects developed in the United Nations Development Program (UNDP). Critical in how UNDP functions and takes a role within the UN system, the intellectual boundary objects are defined in terms of "management of the ongoing tensions that arise between the realms of knowledge and politics." In a review of the influential authors' assessments (e.g., Amartya Sen, Thomas Pogge) on the topic, St. Clair provides three norms (i.e., accountability, equity, and deliberative participation) to form a more fair system. Although more discussion is expected on these three norms and how they could perform within the realm of UNDP, the author does provide a theoretical set-up.

In Part III, statistics within the realm of government is studied. First, Williams' chapter is a historical introduction to the usage of statistics in criminal records during the 19th century in the UK. This chapter shows how counting the number of criminal activities was used to measure government policy effectiveness. By keeping track of criminal profiles through the Habitual Criminals Register, the British government was able to detect the change of behavior and tendency of criminal activity.

In the second chapter, Balka discusses how triage (in medical care) can be used as a boundary object. Defining triage as a classification system, Balka shows how the system is

used to determine the level of illness of a patient and to determine how fast the patient should receive medical care. To Balka, the electronic triage system could improve not only patient care but also institutional (e.g., hospital management) and governmental efficiency.

In the third chapter in Part III, Lomell discusses the ways in which crime statistics are presented that changed policing behavior on a particular crime in Oslo. Lomell's presentation of how individuals add meaning into numbers rather than understanding from them is useful. In a sense, interpretation of numbers is more important than simply using numbers to understand a phenomenon.

In the fourth chapter, Hammer and Tvedten focus on the Norwegian educational quality assessment system launched through a website (*Skoleporten*) providing detailed statistical information. As a result of a major accountability change in the school system in 1991, the assessment procedures are revised from compulsory national tests to the assessment of the learning environment, and to the establishment of *Skoleporten*. The authors further discuss *Skoleporten's* functions as a national instrument to monitor the development of educational indicators not only for the officials but also for the public.

In the final chapter of Part III, Jerak-Zuiderent and Bal provide a discussion on performance indicators in health care. This is an interesting chapter focusing on the difficulty of operationalization from the conceptualization phase to the measurement phase in empirical research. The chapter provides a neat empirical discussion on the conceptualization of performance indicators. The major contribution of the chapter to this book is to show that numbers have meanings but these meanings should be interpreted in line with the complexities of the tasks in health care.

Finally, in Part IV Tøndel and Gundhus provide a discussion on two distinct policy domains: medical decision making through the Diagnosis Related Groups (DRG) and policing through the usage of Geographical Information System (GIS). First, Tøndel painstakingly details the medical diagnosis procedure in the Norwegian hospitals. Through detailed examination of the physicians and their strategies on patient care, this chapter is useful in the understanding of the procedure of diagnosis making and its (in)effectiveness through the DRG. Second, Gundhus argues the usefulness of the GIS system in understanding and solving crimes, for the betterment of policing in Oslo. On the basis of observational research and interviews, Gundhus discusses certain difficulties of implementing technological tools as sophisticated as the GIS system, with emphasis on the potential contributions of the GIS in policing.

Evidently, this book includes quite a variety of policy domains across different countries all of which deal with numbers and statistics. If there is one thing to criticize in the book it would be the largely varying standards of evidence in the empirical tests conducted by the authors. While some authors collect data through qualitative methods (in-depth interviews and observation), other authors offer a rather basic understanding of hypothesis testing with no credible standards of evidence for or against a research hypothesis. Plus, although the content is on statistics, no statistical tests are used to test any research hypothesis. Nonetheless, this book includes a number of very useful chapters drawing empirical research from distinct countries on distinct social and political issues, which is certainly the major contribution of the work.

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**Jim Q. Smith.** *Bayesian Decision Analysis. Principles and Practice.* Cambridge: Cambridge University Press, 2010. ISBN 978-0-521-76454-4, 338 pp, £35.00.

Statistics as a field provides a way of collecting and examining data to make informed decisions. However, the consequences of these decisions are seldom taken into account in the analysis. This book presents a comprehensive approach to decision analysis using Bayesian inference. In my opinion, it is certainly an excellent approach since Bayesian inference provides a suitable framework for some important issues of decision making such as combining different sources of information, eliciting experts' opinions (as probability distributions) and computing the chances of different outcomes and rewards.

This work is based on the author's course notes used for several years to teach postgraduate students and it brings different tools together. Several important topics are covered in the book, such as graphical models and multi-attribute decision making. All the concepts are explained in detail but a good background in probability and Bayesian analysis is important in order to follow the book without problems.

The book is divided into two parts. The first one covers the fundamentals of decision analysis, whilst the second part of the book describes how to extend all these ideas to the multivariate case.

Chapter 1 provides an introduction to the problem of decision analysis through many examples. It starts by establishing the notation used throughout the book and it introduces the loss function as a tool in decision making. The importance of Bayes' Theorem and its application to the problems of decision making is illustrated with an example on the use of Bayes' rule in the court.

Chapter 2 is devoted to the use of graphical models in decision making. Different types of trees can be used to represent how problems evolve and the outcomes reached by making different decisions. The author describes how historic trees can be used to represent the chronological development of events. After this, decision trees are introduced to show how to represent decisions, probabilities of events and chances of

consequences. Other types of trees discussed in this chapter include rollback decision trees and normal form trees.

Chapter 3 deals with utilities and rewards. It is focused on the probabilistic analysis of different decision strategies, their rewards and how to decide on the best strategy. The chapter starts by stating the St. Petersburg paradox that a decision approach based on a single financial reward may lead to complete disaster. As a result, other utility functions should be used to best measure the consequences of a given choice. Moreover, this chapter provides the tools to build a consistent decision framework by stating an order of the rewards, their probabilistic distribution and the associated decisions. This is crucial to make it clear what decision will be preferred by a decision maker.

To this point in the book, the probabilities involved in the analysis are assumed to be known. However, in practice they are typically unknown but can be elicited by an expert. This is the topic discussed in Chapter 4, which starts with a description of how an expert can elicit coherent probabilities. As these probabilities may be biased, different strategies are discussed to deal with this problem and how to choose the best forecaster by means of a scoring rule.

As Chapter 4 focused on experts' opinions to establish probabilities, Chapter 5 addresses the task of stating probabilities of events using Bayesian inference. It covers some basic models using conjugate prior distributions (for Poisson, binomial, multinomial and normal data) and some other important cases of nonconjugate inference (such as logistic regression). The case of mixtures for model selection is also presented and counterfactuals are described as well.

The second part of the book extends the ideas presented in the first part to the general case in which decisions are based on multiple attributes.

Chapter 6 outlines the extension of decision making to the multi-attribute case and how utility functions for the general framework can be elicited. As an example, the author describes the development of a decision support system in respect of measures to coordinate the responses of different countries after an accidental release from a nuclear power plant – a hot topic these days. In this example, different attributes such as political effect and several radiation health effects are considered in a multivariate utility function. As this problem needs to be dealt with in real time, real-time decision systems are considered at the end of the chapter.

Bayesian networks have been widely used in the development of systems for decision making and expert systems. These are described in Chapter 7. Bayesian networks provide a good framework to encode dependences among the different variables involved in the decision making process. The main aspects of Bayesian networks are described, such as directed acyclic graphs, conditional independence, and how the Bayesian network should be elicited. Some computational issues about efficient storage of probabilities are discussed. Propagation in Bayesian networks is described at the end of the chapter.

Chapter 8 extends the graphical representation of problems to include influence diagrams and causal Bayesian networks. Influence diagrams are a useful tool which integrates probabilities of events, outcomes of decisions, and associated utilities. Causality is also considered in this chapter and its representation using different types of trees is discussed, including causal Bayesian networks. Finally, the representation of times series and the dynamic linear model, as a particular case of Bayesian networks, is discussed.

Chapter 9 treats learning about model parameters in a multivariate setting. Starting from a description of hierarchical models, some key issues with regard to the separability of a likelihood, independence and orthogonality of the models parameters are discussed. The aim is to provide the statistical tools to work with multivariate hierarchical models. Estimation of probabilities on trees and Bayesian networks is covered. Finally, the case of inference based on large samples is considered.

To wrap up, Chapter 10 provides a four-page summary and concluding remarks. In this way, the author provides a view of the whole picture of the problem of decision analysis.

The book includes a summary and set of exercises at the end of each chapter. The summary is attractive because it highlights the key issues in the chapter. Having a list of exercises is interesting as they provide several case studies and tests that can help to bring insight into the topic in the classroom.

Overall, this is a very good book for a course in decision analysis using Bayesian inference. Furthermore, it is also a very good reference to introduce other important topics such as Bayesian networks and other types of graphical models. The examples discussed throughout the book make it useful for the practitioner too. Hence, I highly recommend this book for anyone interested in Bayesian decision analysis with a good background in probability and statistics.

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**Marcel Das, Peter Ester, and Lars Kaczmirek (eds).** *Social and Behavioral Research and the Internet: Advances in Applied Methods and Research Strategies.* New York: Routledge Publishing, 2010. ISBN 978-1-84872-817-2, 449 pp, \$47.95.

This concisely written book covers an extensive range of topics related to web survey research and strongly makes the case that web and other technology-based surveys are the wave of the future. The coverage of topics such as usability, ethical considerations, and the use of paradata provides a springboard for solid scientific research even as the technology used to collect survey data advances by leaps and bounds. The book is targeted toward academic and market researchers who collect data via the Internet, but it is written clearly enough for an undergraduate to understand the content. This book differs from the most popular texts on survey design because its content encompasses both basic design issues and methodological and data quality issues. All of the chapters are well-written and would stand alone as articles, but complement each other well in this book format.

The sixteen chapters are divided into three Parts: Part I gives a summary of the current state of Internet survey research; Part II focuses on the design of Internet surveys; and Part III describes data quality issues and new advances in the field. Much of the book's content

is based on the well-known Longitudinal Internet Studies for the Social Sciences (LISS) panel data.

Chapter 1, written by the editors, gives an overview of the book content, which leads into Chapter 2, by Jolene Smyth and Jennie Pearson, which gives a brief summary of the history of Internet surveys and their strengths and weakness. Chapter 3, by Edith de Leeuw and Joop Hox, covers Internet surveys as part of a mixed-mode design. It begins with an entertaining story about the first documented survey conducted by Sir John Sinclair in 1788 and how he used “statistical missionaries” and 23 reminders (the last of which was written in intimidating blood-red ink) to obtain a 100% response rate. The chapter discusses the various modes available for conducting a survey (e.g., different types of self-administered questionnaires and standardized interviews) and presents strengths and weaknesses associated with choosing each one, such as nonresponse and coverage issues.

Chapter 4, by Annette Scherpenzeel and Marcel Das, discusses “true” longitudinal and probability-based Internet panels based on evidence from the the LISS panel study, which made ground-breaking strides in terms of Internet panel research.

Chapter 5, by Annette Scherpenzeel and Jelke Bethlehem, covers the representativeness of online panels and problems with coverage and selection along with possible solutions. This chapter might be intimidating to readers who lack an expertise in mathematics because it includes several complex equations within the text. However, the explanations accompanying the descriptions do a good job of walking the reader through the meaning.

Chapter 6 describes ethical considerations in Internet surveys. This chapter is refreshing because, as this book repeatedly points out, haphazard Internet surveys thrown together quickly are everywhere. Ethical considerations discussed include protecting the confidentiality of responses and obtaining informed consent. Chapter 7, written by Vera Toepoel and Don Dillman, covers how visual design affects the interpretability of survey questions. The chapter covers the three levels of visual processing of a questionnaire page, including the heuristics associated with responding to a survey question put forth by Tourangeau et al. (2004) as well as some research findings.

Chapter 8 by Lars Kaczmirek discusses attention and usability in Internet surveys (effects of visual feedback in grid questions). The chapter connects the principles of survey design and those from usability research.

Chapter 9 by Marije Oudejans and Leah Melani Christian explores the use of interactive features to motivate and probe responses to open-ended questions. Since the Internet allows survey researchers to provide immediate feedback or skip patterns based on responses, this feature provides an avenue to examine what factors might influence responses to open-ended questions.

Chapter 10, authored by Peter Ester and Henk Vinken, examines the concept of measuring controversial issues in Internet surveys with respect to order effects of open and closed questioning. Chapter 11 by Corrie M. Vis and Miquelle A.G. Marchand addresses challenges in reaching hard-to-reach groups in Internet panel research. The authors base most of their conclusions on previous LISS research. They discuss the likelihood that certain groups of potential respondents will drop out and when. Four stages of selection are described – (1) the contact stage; (2) the recruitment stage; (3) the agree-to-panel-participation stage; and (4) the panel participation stage – along with which groups are likely to drop out at which stage.



Chapter 12 by Arthur van Soest and Arie Kapteyn explores mode and context effects in measuring household assets, covering some of the material included in Chapter 2, although not in as much detail. The term “mode effects” usually refers to the fact that there can be differences in the data quality and results of the same survey administered in different modes.

Chapter 13 by Dirk Heerwegh covers Internet survey paradata. As described earlier, Chapter 6 provides general background on paradata. Chapter 13 gives a clear description of the four levels of paradata and the information paradata can provide as described by Kaczmirek (2008). Potential uses for paradata are also described, such as testing and evaluating survey questions, implementing adaptive questionnaires (i.e., ones where follow-up questions can change based on the respondent’s behavior during the previous question), and measurement of attitude strength based on response time (i.e., longer response times indicate weaker attitudes).

Chapter 14 by Mirta Galesic and Ting Yan discusses the use of eye-tracking for studying survey response processes. I really liked the short description of the rich history of eye-tracking research that has been conducted for over a century, as this aspect of the field is often excluded from papers and book chapters on eye-tracking. Eye-tracking methodology can be especially important in survey pretesting (e.g., Ashenfelter et al. 2011) and post-hoc exploration of survey result anomalies (e.g., Ashenfelter 2009). It can also be used to examine cognitive theories. The chapter contains brief summaries of what eye-tracking can do and what has been done with it. A weakness of the chapter is that it does not address the common criticisms of eye-tracking research such as that it does not capture events in the participant’s peripheral. A defense against these criticisms, such as that only what is the subject of active attention is usually of scientific interest, would strengthen this chapter.

Chapter 15 by Mauricio Avendano, Annette Scherpenzeel, and Johan P. Mackenbach addresses the question of whether biomarkers can be collected in an Internet study based on a pilot study in the LISS panel. A biomarker is defined as “a characteristic that is objectively measured and evaluated as an indicator of normal processes, pathogenic processes, or pharmacological responses” (Biomarkers Definitions Working Group 2001, p. 373). The chapter contains a very interesting table (pp. 376–379) that contains eight categories of health conditions and the biomarkers that can be used to detect them. Chapter 16, written by the editors, provides a short wrap-up of the book containing some insightful discussions and conclusions.

Overall, I would recommend this book to both newcomers to the social sciences as an introductory text that covers all of the bases needed to design and implement a Web survey and to more seasoned researchers as a handbook of best practices. This book should be part of every social scientist’s collection.

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<sup>1</sup> This review is released to inform parties of research and to encourage discussion. The views expressed on statistical, methodological, technical, or operational issues are those of the author and not necessarily those of the U.S. Census Bureau.