

Hans Zeisel
David Kaye

Prove It with Figures

Empirical Methods in Law
and Litigation

With a Foreword by Jack B. Weinstein



Springer

Hans Zeisel
(deceased)

David Kaye
College of Law
Arizona State University
Tempe, AZ 85287
USA

Advisors

Stephen Fienberg
Department of Statistics
Carnegie-Mellon University
Pittsburgh, PA 15213

John Rolph
Graduate School of Business
Department of Information and
Operations Management
University of Southern California
Los Angeles, CA 90089

Denise Lievesley
ESRC Data Archive
University of Essex
Colchester, Essex CO4 3SQ
United Kingdom

Library of Congress Cataloging-in-Publication Data
Zeisel, Hans.

Prove it with figures : empirical methods in law and litigation /
Hans Zeisel, David Kaye with a foreword by Jack B. Weinstein.
p. cm.

Includes bibliographical references and index.

ISBN 978-1-4612-7300-4 ISBN 978-1-4612-1824-1 (eBook)

DOI 10.1007/978-1-4612-1824-1

1. Law—United States—Statistical methods. 2. Law—United
States—Methodology. 3. Social sciences—Research—Law and
legislation—United States. I. Kaye, D.H. (David H.), 1947–
II. Title.

KF320.S73Z45 1997

349.73'07'27—dc21

97-9827

Printed on acid-free paper.

© 1997 Springer Science+Business Media New York
Originally published by Springer-Verlag New York, Inc. in 1997
Softcover reprint of the hardcover 1st edition 1997

All rights reserved. This work may not be translated or copied in whole or in part without the written permission of the publisher (Springer Science+Business Media, LLC), except for brief excerpts in connection with reviews or scholarly analysis. Use in connection with any form of information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed is forbidden.

The use of general descriptive names, trade names, trademarks, etc., in this publication, even if the former are not especially identified, is not to be taken as a sign that such names, as understood by the Trade Marks and Merchandise Marks Act, may accordingly be used freely by anyone.

Production managed by Victoria Evarretta; manufacturing supervised by Jeffrey Taub.
Photocomposed copy prepared by the author using Wordperfect 7.0.

9 8 7 6 5 4 3 2 1

ISBN 978-1-4612-7300-4

Contents

Foreword	vii
Preface	ix
Acknowledgments	xiii
List of Figures	xix
List of Tables	xxi
1 The Search for Causes: An Overview	1
2 The Controlled Randomized Experiment	5
2.1 A nearly perfect experiment	6
2.2 Eliminating bias in selecting subjects	8
2.3 Limits to experimentation	10
2.4 The half-a-loaf experiment	12
2.5 Simulation	14
2.6 Limits to extrapolation	21
Critical questions	24
Bibliography	25
3 Inferring Causes from Observational Studies	27
3.1 Diphtheria antitoxin	29
3.2 The Connecticut crackdown on speeders	29
3.3 Capital punishment in Florida	32
3.4 Polio vaccines	33
3.5 Police intervention and domestic violence	35
3.6 No-fault divorce	37
3.7 Statistical “control” for known confounders	38
3.8 Summary	41
Critical questions	42
Bibliography	42
4 Epidemiologic Studies	45
4.1 Types of studies	46
4.2 Agent Orange	50
4.3 Breast implants	53

4.4 Tobacco smoke	57
4.5 Asbestos	60
4.6 Bendectin	62
4.7 Electromagnetic fields	65
4.8 Summary	68
Bibliography	68
5 Summing Up: Replication and Triangulation	69
5.1 Estimating socially significant numbers	70
5.2 Triangulations in the census	71
5.3 Unanimity and hung juries	74
5.4 Opposition to the death penalty and the propensity to vote guilty	75
5.5 Sentence variation from judge to judge	76
Bibliography	77
6 Coincidence and Significance	79
6.1 P-values	80
6.2 Significance	85
6.3 Power	88
6.4 One-tailed and two-tailed tests	89
6.5 Multiple testing	92
6.6 Interval estimates	94
6.7 Other hypotheses	96
6.8 Posterior probabilities	97
Critical questions	99
Bibliography	100
7 Sampling	101
7.1 The road to the acceptance of sampling	101
7.2 The miracle of sampling	103
7.3 Some sources of bias	105
7.4 Drawing a probability sample	107
7.5 Sample size	108
7.6 The danger of mail surveys: nonresponse bias	110
7.7 Quota samples	116
7.8 Convenience samples	117
7.9 Summary	118
Critical questions	119

Contents	xvii
Bibliography	119
8 Content Analysis	121
8.1 A study of the House Un-American Activities Committee	122
8.2 Pretrial publicity	128
8.3 The Federalist Papers	132
Bibliography	134
9 Surveys and Change of Venue	135
9.1 History of survey acceptance	136
9.2 Change of venue law	138
9.3 Mitsubishi in Silicon Valley	141
9.4 The Pontiac prison cases	142
9.5 Civil litigation	143
9.6 The limits of voir dire	144
Bibliography	146
10 Trademark Surveys: Genericness	147
10.1 The Thermos surveys	148
10.2 The Teflon surveys	150
10.3 Variations of the Teflon survey	152
Bibliography	153
11 Trademark Surveys: Confusion	155
11.1 Realism	156
11.2 How close a look?	158
11.3 Who puts out this design?	162
11.4 Altering the specimen	164
11.5 Controlling for “top of mind” responses	165
11.6 Anticipating market entry	166
11.7 Addressing the relevant issue	167
11.8 Depressors and aggrandizers	170
11.9 Summary	172
Bibliography	174
12 The Jury: Composition and Selection	175
12.1 Jury size	175
12.2 Selecting the jury venire	177

12.3 Selecting from the venire	184
12.4 Juror selection surveys	191
Bibliography	197
 13 DNA Profiling: Probabilities and Proof	 199
13.1 VNTR profiling	200
13.2 Match windows	204
13.3 Match probabilities and the basic product rule	206
13.4 Objections to the basic product rule	212
13.5 Ceiling frequencies	214
13.6 Uniqueness	216
13.7 Random match probabilities and prejudice	217
13.8 Beyond matching and binning	220
Bibliography	223
 Notes	 225
Glossary	321
List of Cases	347
Index	351

List of Tables

2.1. Effect of Random Assignment of Texas Convicts to Treatment and Control Groups

2.2. Percentage of Re-arrests in Georgia Within One Year

2.3. Jury's Pre-Deliberation Verdict by Type of Crime and Type of Instruction (Percent Voting "Not Guilty by Reason of Insanity")

3.1. Polio Incidence in Treatment and Control Groups (per 100,000)

3.2. Demographic Profile of Three Contiguous States (1960 data)

4.1. Death Rates of Ranch Hands and of a Comparison Group of Air Force Personnel not Exposed to Agent Orange

4.2. Incidence of Connective-Tissue Disease in Women with Breast Implants and Women Without Implants (Nurses Study)

4.3. Incidence of Smoking in Men Who Had Lung Cancer (Cases) and in Men Who Had Other Diseases (Controls)

4.3A. Incidence of Very Heavy Smoking in Men Who Had Lung Cancer (Cases) and in Men Who Had Other Diseases (Controls)

4.4. Risks of Lung Cancer Associated with Asbestos Exposure and Smoking

5.1. Last Vote at Which Juries Were Hung

6.1. Hypothetical Data for Control and Treatment Groups of Size 1,000. (The P-value is 0.54.)

6.2. Hypothetical Data for Control and Treatment Groups of Size 10,000. (The P-value is 0.05.)

6.3. Hypothetical Data for Control and Treatment Groups of Size 40,000.(The P-value is 0.0001.)

6.4. Hiring Data and Census Figures in *Hazelwood* for Teachers Hired During 1972-1974

7.1. Gallup Polls and Outcomes of Presidential Elections

7.2. Stationery Orders by Size of Order

7.3. Place of the Customers' Residence

7.4 Number of Trials Reported per Judge

8.1. Type of Action Involved in the Misdeeds Alleged in the Committee's Question

8.2. Percent and Number of Misdeed Questions Asked After the First Refusal

8.3. Average Number of Misdeed Questions Asked of a Witness Before or After the First Refusal

8.4. The 125 Items of Pretrial Publicity Judged to be Most Harmful to Ford's Prospects

10.1. Results of the Teflon Test

11.1. Percent Who Named McDonald's in Survey with Warm-up Question and in Survey Without Warm-up Question

12.1. The Varieties of Civil Juries in the Federal Courts and State Courts of Unlimited Jurisdiction

12.2. Percent "Good" Jurors (hypothetical data)

13.1. Expected Single-Locus Genotype Proportions in Gametes Formed by Random Mating

13.2. The Formulae for Computing a Multilocus Genotype Frequency (P) from Allele Frequencies (p) for a Population in Hardy-Weinberg and Linkage Equilibrium

13.3. The Formulae for Computing a Multilocus Genotype Frequency (P) from Allele Frequencies (p) for a Population in Hardy-Weinberg and Linkage Equilibrium, Using $2p$ Rather than p^2 for Apparent Homozygotes

13.4. VNTR Allele Frequencies at Four Loci by Race

13.5. Single- and Multilocus Genotype Frequencies Estimated with the Basic Product Rule

13.6. Interim-Ceiling Frequencies at Each Locus and Their Product