Preface to the Second Edition

The second edition differs from the first in two ways: there is additional material, and there is a new relationship with the R statistical language, including a companion R package DOS2. Also, a few errors have been corrected.

New Topics in the Second Edition

There are four new chapters:

- Chapter 7: Some Counterclaims Undermine Themselves
- Chapter 19: Choice of Test Statistic
- Chapter 20: Evidence Factors
- Chapter 21: Constructing Several Comparison Groups

There are numerous additions and revisions to existing chapters, including the following new sections:

- Section 2.4.4: The Average Treatment Effect
- Section 3.6: Amplification of a Sensitivity Analysis
- Section 5.4: Strengthening Weak Instruments
- Several new sections in Chapter 10.
- Several new sections in Chapter 11.
- Section 13.6: Isolation in Natural Experiments
- Section 18.3: Can Coherence Be Discovered?

R in the Second Edition

There is a new R package DOS2 available at cran. It contains software and data, and it reproduces many analyses from the second edition. There is also a more limited, new package DOS for the first edition. In addition to different content, the help-files for DOS and DOS2 refer to the first and second editions, respectively.

The first edition contained the text of some R functions. These have been removed and placed in the packages DOS2 and DOS.

Since the publication of the first edition, there have been many new R packages devoted to the design and analysis of observational studies. The second edition describes some of these packages. Specifically, several chapters of the second edition end with sections entitled "Software" or "Data" describing available resources in R. The index contains entries for "R packages," "software," and "data".

A shinyapp at http://rosenbap.shinyapps.io/learnShiny/ permits you to conduct an interactive sensitivity analysis for an observational study of smoking and periodontal disease. No knowledge of R is required. The shinyapp runs R in the background, but use of the app is point-and-click. The app illustrates several issues: (i) randomization inference using Huber's m-statistics (§2.8) (ii) sensitivity

analysis for P-values, estimates and confidence intervals (§3.4), (iii) amplification of sensitivity analysis (§3.6), (iv) the fact that a poor choice of test statistic leads to an understatement of insensitivity to unmeasured bias (Chapter 19). The app will show the R code if you request it.

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                                                                                                               25 November 2019