

Professional Ethics for Statisticians: An Organizational History

Howard Hogan

Duane Steffey

ASA Committee on Professional Ethics

Abstract

Developing ethical guidelines and standards for a scientific profession is a long-term, evolutionary process. Although the ASA was established in 1839, it operated for over one hundred years without a written code of conduct. Beginning in the 1950s, largely through the efforts of two *ad hoc* committees and with the input of a great number of people, the ASA developed and published a set of ethical guidelines for statistical practice. The guidelines address the responsibilities of statistical practitioners to other involved parties—colleagues, peers, clients, employers, funders, and research subjects—as well as in publications, testimony, and allegations of misconduct.

The ASA Committee on Professional Ethics, made permanent in 1986 and charged with maintaining and communicating the guidelines, is now assessing which elements of the current set of guidelines (last modified in 1999) should be revised or expanded to reflect the evolution of statistical practice. A committee-organized invited session at this year's Joint Statistical Meetings will discuss "Ethical and Policy Issues in the Statistical Use of BIG Data." Other sessions in recent years have examined the teaching of ethics and presented examples of real-life ethical dilemmas for statistical practitioners. We encourage members of the profession to contribute their ideas for preserving relevant and useful guidance in contemporary statistical practice.

Key Words: professionalism, shared values, responsibilities

1. ASA Committee on Professional Ethics

The ASA Committee on Professional Ethics comprises nine members, three of whom are appointed each year by the ASA President-Elect to serve three-year terms. The committee chair is also appointed by the ASA President-Elect. The committee has no authority to act on, rule on, or arbitrate ethical matters, nor is it involved directly in professional certification.

1.1 Committee Charge

- To provide a point of contact with other societies and associations in the area of professional ethics.
- To develop and implement a program of education sensitizing members of ASA to the ethical issues in statistical practice and in other fields in which statistics is used.
- To maintain and promulgate the set of ASA Ethical Guidelines describing the general view of ethics in statistical practice.

2. Past

2.1 Ethical Guidelines: A Timeline

- 1839 – Founding of ASA
- 1934 – Publication of “The Role of Statistics in the New Reich” in the journal of the German Statistical Society
- 1939 – Mandatory collection of data on religion in 1939 German census.
- 1945 – World War II ends
- 1949 – First ASA committee recommendation for development of a code of ethical practice
- 1951 – Session on statistical standards held at ASA annual meeting
- 1952 – First ASA *ad hoc* committee appointed
- 1954 – *Ad hoc* committee recommends establishment of standards
- 1954 – Publication of *How to Lie with Statistics*; Joseph McCarthy censured for contempt of Senate rules
- 1956 – Further action on standards deferred after ASA membership survey found limited interest
- 1958 – Deming proposes ethical principles in IMS invited address
- 1962 – President Kennedy authorizes advisory committee on smoking and health
- 1963 – Freeman article on maintaining professional integrity published in *American Statistician*
- 1964 – Publication of Surgeon General’s report on negative health effects of smoking
- 1965 – Deming’s principles published in *Annals of Mathematical Statistics*
- 1972 – Watergate burglary and start of related investigation
- 1973 – Gibbons article on need for a code of ethics published in *American Statistician*
- 1977 – ASA established Ad Hoc Committee on Code of Conduct
- 1981 – Code of Conduct approved by Board of Directors on three-year trial basis; *Ad Hoc* Committee on Professional Ethics created to continue work on ethical guidelines
- 1985 – First declaration on professional ethics by International Statistical Institute
- 1986 – Committee on Professional Ethics designated as permanent ASA committee
- 1999 – Current edition of ethical guidelines approved by ASA Board of Directors
- 2003 – Vardeman and Morris article on ethical responsibilities published in *American Statistician*
- 2008 – World financial crisis
- 2010 – Revised declaration on professional ethics by International Statistical Institute

2.2 Ideals (Brown, 1952)

1. A burning desire to find the truth.
2. Thorough care to understand completely the work of others.
3. A constant effort to present clearly the work of my hands.
4. A diligent search to develop evidence bearing on an hypothesis rather than on a predetermined conclusion.
5. The wise use of methods to produce the best results from the analysis in relation to the problem in hand.
6. The willingness to answer reasonable requests about the details of statistical work if such request is honestly justified.

2.3 Statistician’s Oath (Freeman, 1952)

- “... I will be a seeker of truth.”

- “... I will search for those facts expressed in numbers which show events and relationships most truly.”
- “... I will not be a fraud, who selects figures to prove by chicanery a misnamed conclusion.”

2.4 Summary of Freeman’s 12 Principles

1. Seek to express the truth in figures.
2. Do not select or treat figures to prove a misnamed “conclusion.”
3. Preserve anonymity of source when promised as a condition of receiving information.
4. Preserve confidence of client or employer when applicable to study.
5. Strive through logic and diplomacy to prevent misuse of work product (e.g., figures).
6. Use best judgment in drawing conclusions from samples.
7. Resist the temptation to interpret results unwarrantedly as confirming an hypothesis.
8. Advise employer or client on meaning of work product and statistician’s code of ethics.
9. Before undertaking a survey, be assured of the necessity and likelihood of obtaining useful results.
10. Do not selectively report results to satisfy specific points of view.
11. Train subordinates in intellectual honesty as well as competence.
12. Train students to use statistics honestly and to adopt the highest ethical standards.

2.5 Motives for a Professional Code (Jowell, 1981)

- Defend against improper pressure by clients and employers
- Disabuse those who view statistics as a mischievous and meddlesome discipline
- Create a stronger professional identity among statisticians

2.6 Case Study Approach

- Recommended by 1952 ASA committee as a procedure to formulate standards with broad consensus support of membership
- Based on “critical incident” technique developed and used successfully by American Psychological Association
- Area of focus by current ASA ethics committee as key component of education program

3. Present

3.1 JSM 2014 Invited Session

- Ethical and Policy Issues in the Statistical Use of Big Data
- Past Invited JSM Sessions
 - Teaching Ethics in Statistics and Biostatistics (2013)
 - Real-Life Ethical Dilemmas Encountered in the Practice of Statistics (2009, 2011, 2012)

3.2 Recent Co-Sponsored JSM Sessions

- Ethical Issues in Clinical and Translational Biostatistics (2014)
- Privacy, Big Data, and the Public Good (2014)
- How to Share Research Data (2012)

- Solo Consulting (2012)
- The New World of Data on Human Beings (2011)
- Safety and Informed Consent in Human Rights Field Research (2011)

3.3 Published Case Studies

3.3.1 “After the Fact” Co-author?¹

As a professional statistician, you are called by a colleague to examine and “bless” a biomedical experimental report. You are urged to do it quickly because the report has already been submitted and accepted for publication in a prestigious journal in the author’s field. One of the reviewers, however, had suggested that a quick review by a statistician might be in order. To your horror, the report appears to be utter statistical nonsense. The data were not sampled according to any plan, but rather were drawn from various similar experiments done for different purposes. There is no reason to assume the observations were random or independent within or among data sets. There was no definition of how many data points had been originally available or how those used had been selected. The scatter plots within the paper were plainly skewed, but the computer statistical tests which had been run would have presumed a normal distribution. You explain gently that the statistical work is not an asset to the paper and could prove embarrassing to the author and the institution if published. You suggest that he eliminate the statistical portions and describe his work based on the qualitative reasoning which he obviously used. Initially very angry, he calms down and says, “I’ll leave the contents alone, but I will add you as a coauthor. How’s that?”

How do you reply? How is your reply conditioned by the relative power positions you may hold? If you are unable to reach an accommodation with the author, under what conditions, if any, would you write to the journal editor to preclude publication? Under what conditions, if any, would you decline to comment on the paper yourself, but refer the author to another colleague whose statistical expertise you consider to be so minimal that he or she might approve the paper as written?

3.4 Current Ethical Guidelines (1999): General Topic Areas

- Professionalism
- Responsibilities
 - To funders, clients, and employers
 - In publications and testimony
 - To research subjects
 - To research team colleagues
 - To other statisticians or statistical practitioners
 - Regarding allegations of misconduct
 - Of employers

3.5 Links to Ethical Guidelines for Statisticians

- American Statistical Association’s Committee on Professional Ethics (1999), “Ethical Guidelines for Statistical Practice,” <http://www.amstat.org/about/ethicalguidelines.cfm>

¹ From John Gardenier, “Toward a Statistical Ethics Casebook,” *Joint Statistical Meetings*, 1997.

- International Statistical Institute (2010), “Professional Ethics,” <http://www.isi-web.org/special-topics/professional-ethics>

4. Future

4.1 Ongoing Committee Activities

- **New and reformatted case studies**
- Anticipation of or response to new trends
 - Invited JSM sessions (2015 and beyond)
- Revision of ethical guidelines, 1999 edition
 - **Reformatting (draft below for discussion)**
 - Content revision
- Ethics pamphlet

4.2 New and Reformatted Case Studies

4.2.1 Situation:

A chemist has analyzed data and the results will be sent to the EPA in support of product submission/approval. His supervisor suggested that he contact a statistician to make sure that the data have been analyzed appropriately. The chemist visits with you and asks that you look over his results and send an email message indicating that the analysis is fine. You consult with the chemist to understand the experiment and the data, ask for the raw data, and do your own statistical analysis. Unfortunately, the chemist has analyzed the data incorrectly and your statistical analysis yields a result contrary to the chemist’s result, which may decrease the chance of receiving approval from the EPA. The chemist is unhappy and wants to submit his results.

4.2.2 Discussion:

- What would your response be?
- What part(s) of the ASA Ethical Guidelines are relevant to this scenario?
- What would your response be if the chemist was your boss?
- What would your response be if the chemist’s analysis was flawed, but the results were consistent with what you found in your analysis?

4.3 Reformatted Ethical Guidelines (Draft for Discussion)

4.3.1 Preamble

- Purposes of the guidelines
 - To help statisticians² make and communicate ethical decisions
 - To inform employers of statisticians and those relying on statistical results of expected standards
- All statisticians have a social obligation to perform work in a professional, competent, and ethical manner
- Application of ethical guidelines generally requires good judgment and common sense.

² The term “statistician” shall be read to include all practitioners of statistics, regardless of job title or field of degree.

4.3.2 Professionalism: The Ethical Statistician Shall...

1. Strive for relevance in statistical analyses.
2. Guard against predetermination of results.
3. Use data collection and analytic methods designed to ensure valid analyses.
4. Remain current in evolving methodology.
5. Ensure adequate statistical and subject-matter expertise are both applied.
6. Use only methods suitable to the data.
7. Join only research with expected validity.
8. Understand the theory, data, and methods.
9. Recognize the chance of spurious significance.
10. Respect and acknowledge the contributions and intellectual property of others.
11. Disclose and resolve conflicts of interest.
12. Provide only such expert testimony as you would be willing to have peer reviewed.

4.3.3 Funders, Clients, and Employers: The Ethical Statistician Shall...

1. Present choices among valid approaches varying in scope, cost, or precision.
2. Clearly state relevant qualifications/experience.
3. Clarify respective roles of study contributors.
4. Explain consequences of deviation from study plan.
5. Apply data collection and analysis procedures without predetermining the outcome.
6. Make new statistical knowledge widely available.
7. Guard privileged information.
8. Fulfill all commitments.
9. Accept full responsibility for performance.

4.3.4 Publications and Testimony: The Ethical Statistician Shall...

1. Maintain personal responsibility for all work bearing your name.
2. Report all statistical and substantive assumptions.
3. Identify who is responsible for statistical work.
4. Clarify basis for authorship order.
5. Account for all data considered in a study.
6. Report sources and assessed adequacy of data.
7. Report data cleaning, screening, and imputation.
8. Report all steps taken to guard validity.
9. Address potential confounding variables.
10. Identify the sponsor, purpose, and intended use.
11. Include disclaimers when reporting analyses of non-representative data.
12. Report inference limits and possible sources of error.
13. Share data used in published studies with due protection of proprietary and confidential data.
14. Promptly correct errors discovered after publication.
15. Write with the intended audience in mind.

4.3.5 Research Subjects: The Ethical Statistician Shall...

1. Know and adhere to rules for protection of human subjects.
2. Make informed recommendations for study size.
3. Avoid excessive risk and burden to subjects.
4. Protect privacy/confidentiality of subject data.

5. Be aware of legal limitations on assurances of privacy and confidentiality.
6. Consider whether appropriate research subject approvals were obtained.
7. Avoid or minimize the use of deception.
8. Know and adhere to animal welfare guidelines.

4.3.6 Research Team Colleagues: The Ethical Statistician Shall...

1. Inform non-statisticians about ethical aspects.
2. Promote effective and efficient use of statistics.
3. Respect ethical obligations of non-statisticians.
4. Ensure professional reporting of statistical design and analysis.
5. Avoid compromising validity for expediency.

4.3.7 Other Statisticians: The Ethical Statistician Shall...

1. Promote sharing of nonproprietary data and methods.
2. Be willing to help strengthen the work of others.
3. Assess methods, not individuals.
4. Respect differences of opinion.
5. Instill in students an appreciation for the practical value of their knowledge.
6. Use professional qualifications and contributions as an important basis for employment decisions.
7. Avoid harassing or discriminating against statisticians.

4.3.8 Allegations of Misconduct: The Ethical Statistician Shall...

1. Avoid condoning or appearing to condone careless, incompetent, or unethical practices.
2. Deplore all types of professional misconduct.
3. Distinguish differences of opinion and honest error from willful misconduct.
4. If involved in a misconduct investigation, know and follow prescribed procedures.
5. Following a misconduct investigation, support efforts of those involved to resume their careers.
6. Do not condone retaliation against those who call attention to possible scientific error or misconduct.

4.3.9 Employers of Statisticians Shall...

1. Recognize study results may not match expectations.
2. Recognize valid findings result from competent work in a moral environment.
3. Make new statistical knowledge widely available.
4. Support sound statistical analysis.
5. Protect the professional freedom of subordinates.
6. Not include statisticians as authors or acknowledged contributors without permission.

References

American Statistical Association Committee on the Integrity of Federal Statistics (1973), "Maintaining the Integrity of Federal Statistics," *The American Statistician*, Vol. 27, No. 2 (Apr., 1973), pp. 58-67, American Statistical Association, Stable URL: <http://www.jstor.org/stable/2683958>

- Brown, Theodore (1952), "The statistician and his conscience", *The American Statistician*, 6, 14-18.
- Clausen, John A., Herbert S. Conrad, William W. K. Freeman, Nicholas Hobbs, John W. Hopkins, Alfred N. Watson and Rensis Likert (1954), "Report of the Ad Hoc Committee on Statistical Standards", *The American Statistician*, Vol. 8, No. 3 (Jun. - Jul., 1954), pp. 19-23 American Statistical Association. Stable URL: <http://www.jstor.org/stable/2685458>. Accessed: 02/01/2014 15:35
- Deming, W. Edwards (1965), "Principles of Professional Statistical Practice," *The Annals of Mathematical Statistics*, Vol. 36, No. 6 (Dec., 1965), pp. 1883-1900 Institute of Mathematical Statistics. Stable URL: <http://www.jstor.org/stable/2239137>. Accessed: 06/01/2014 09:29
- Ellenberg, Jonas H. (1983), "Ethical Guidelines for Statistical Practice: A Historical Perspective," *The American Statistician*, 37, 1-4.
- Freeman, W. W. K. (1952), Discussion of "The Statistician and His Conscience," by T. H. Brown, *The American Statistician*, 6, 18-20.
- Gardenier, John, (1997), "'After the Fact' Co-author? Toward a Statistical Ethics Casebook," *Proceedings of the 1997 Joint Statistical Meetings*, Alexandria, VA: American Statistical Association.
- Gibbons, Jean D. (1973), "A Question of Ethics," *The American Statistician*, Vol. 27, No. 2 (Apr. 1973), pp. 72-76 Published by: American Statistical Association. Stable URL: <http://www.jstor.org/stable/2683960>. Accessed: 02/01/2014 15:28
- Jowell, Roger, (1981), "A Professional Code for Statisticians?: Some Ethical and Technical Conflicts," invited paper, plenary session of the International Statistical Institute's 43rd Diennial Session, Buenos Aires, 1 December 1981.
- Vardeman S. B., and Morris, M. D. (2003), "Statistics and Ethics: Some Advice for Young Statisticians," *The American Statistician*, 57, 21-26, American Statistical Association, Stable URL: <http://www.jstor.org/stable/30037278>. Accessed: 29/08/2014 14:32