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# Ethical Guidelines for Statistical Practice: A Historical Perspective

JONAS H. ELLENBERG\*

## 1. INTRODUCTION

Gibbons (1973) and more recently Jowell (1981) have traced the inception of interest in the development of a professional code for statisticians to the period following World War II. Jowell commented that the International Statistical Institute (ISI) has survived for nearly 100 years without such a code. The American Statistical Association (ASA) has been in existence for over 150 years, also without an officially sanctioned professional code of principles (either ethical or technical).

Since the historical perspective of the past 30 years may be useful to ASA members in developing their views on the suitability of the Ad Hoc Committee on Professional Ethics' (1982) trial "Ethical Guidelines for Statistical Practice," we have reviewed the available literature on this issue and have tried to focus on past writings as they relate to the evolution of the current guidelines.

Following this historical overview, the trial "Ethical Guidelines for Statistical Practice," approved by the Board of Directors of the American Statistical Association, is printed in its entirety. Fourteen distinguished statisticians with a broad spectrum of professional interest have reviewed the guidelines, and their comments along with a response from the Ad Hoc Committee on Code of Conduct are also presented. It is hoped that this sequence of articles will provide the basis for a vigorous dialogue among members of the ASA.

## 2. HISTORICAL OVERVIEW

The Committee on Committees of the American Statistical Association first recommended in 1949 that the development of a code of ethical practice be part of the mandate of the then newly formed ASA Commission on Statistical Standards and Organization.

In 1952 the Board of Directors of ASA authorized then President William G. Cochran to appoint an ad hoc committee to undertake this task. This Ad Hoc Committee on Statistical Standards,<sup>1</sup> under the chairmanship of Rensis Likert, made its proposals for the development of standards in 1954 (Ad Hoc Committee on Statistical Standards 1954a). The committee con-

cluded that "It is desirable for ASA to work towards a statement of agreed standards, both technical and ethical, . . . that the Committee should concern itself with general principles, . . . and that the Committee should follow a procedure which will assure that any standards that are formulated will have support from a very substantial majority of ASA members." The committee specifically recommended that a survey of the membership be undertaken to estimate the desire for standards among ASA members. It was further recommended that the ASA adopt procedures for the development of the guidelines similar to those used by the American Psychological Association, namely,

1. the use of the critical incidents method for establishing the issues—as seen by Association Members—on which standards are needed, and indicating the degree of consensus;
2. reliance upon widespread participation by members in the process of developing the standards.

By stipulating these procedural mechanisms, the committee would develop the standards from the contributed descriptions of episodes involving ethical principles or problems experienced by ASA members. Thus the standards would evolve from "member experience, rather than having a committee prepare from its own limited experience the statement of standards." It is of interest to note that the committee, while not specifically proposing any type of certification for statisticians, considered a code of standards as a necessary precursor to any certification procedure.

Prior to the release of this report, several papers were presented at the 1951 Boston meetings of the ASA on standards of statistical conduct in business and government. Court (1952) proffered that "standards of conduct for the statistical profession should emphasize specifics rather than dwelling on honesty, loyalty, and dependability, which apply with equal force to all human endeavor." Morton (1952) indicated that while statisticians unquestionably should adhere to "recognized standards of professional performance, . . . different types of statistical performance create different problems of conduct." With this viewpoint, he classified statisticians into the following three broad groups, with differing levels of ethical problems.

1. The statistical theorist: . . . we need not concern ourselves with his conduct.
2. The statistician—subject matter specialist (e.g., statistical geneticist): . . . Problems of statistical conduct . . . will seldom become acute.
3. The fact-finding statistician: . . . the question of standards of conduct becomes important both as a morale builder and as a protective device.

Morton cautioned that statisticians may find themselves in complex situations involving divided responsibilities and loyalties and that unilateral adherence (on the part

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<sup>1</sup>The members of the Ad Hoc Committee on Statistical Standards were Rensis Likert, Chairman; John A. Clausen; Herbert S. Conrad; William W.K. Freeman; John W. Hopkins; and Alfred N. Watson.

of statisticians) to a set of standards would not make a substantial change in statistical practice without an effort directed at the education of the public concerning the “function and scope of statisticians.”

Brown (1952) discussed the possibility of three types of codes. The first type, patterned after the Hippocratic oath, would not fare well since, he argued, the physician is faced with a client who wishes to get well, while the statistician is faced with clients who sometimes want to do poorly. The second was a self-righteous code of ethics. He rejected this as unwise since “it will either be forgotten, go unobserved, or will serve to narrow the habits of the statistician to a rigid conformity. If this last condition should happen, the statistician’s value is gone.” Brown finally turned to the biblical model with a few general ideals and many hints, not a set of specific rules to govern all circumstances. He suggested as some of these ideals (abbreviated):

1. A burning desire to find the truth.
2. Thorough care to understand 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 a 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.

W.W.K. Freeman (1952) suggested the following statistician’s oath (to be issued to signatories in a form suitable for framing):

Like Euclid and all the other great thinkers who have used symbols to reveal truths of nature, I will be a seeker of truth.

Realizing that numbers are only a shorthand convention for describing past events and forecasting trends, I will search for those facts expressed in numbers which show relationships and events most truly.

Though surrounded by the clamor of the marketplace or of the political arena, I will not be a fraud, who selects figures to prove by chicanery a misnamed conclusion.

He went on to provide ideas for specific provisions in support of such an oath that might provide statisticians with a “moral force to support their integrity:”

1. A statistician seeks to express the truth in figures. He searches for figures which show relationships most truly, within the limits imposed on him by time and economy. He does not design an experiment to yield biased results . . . When the figures available do not, in his best judgment, represent the facts, he gives proper warning of their limitations.
2. A statistician does not select nor treat figures to prove a misnamed “conclusion.”
3. If source material is furnished him on condition that the respondent should not be specifically identified, he preserves this anonymity.
4. If a study of a confidential nature is made, the statistician preserves the confidence of his client or employer.
5. He does his utmost through logic and diplomacy to prevent the misuse of figures prepared by him, and if such misuse comes to his attention, he gives proper warning, within the limits imposed on him by the requirement that he preserve the confidence of his client or employer.
6. In drawing conclusions from samples, he uses his best judgment. If valid tests for probability cannot be made, or (in biology, for example) if valid tests through repetition have not been made, he gives proper warning.

7. As a research worker, a statistician resists the temptation to interpret his results unwarrantedly as confirming his hypothesis.
8. A statistician keeps his employer or client informed of the meaning of figures and of the statistician’s code of ethics, so that his employer may avoid improper requests. With logic and diplomacy he does his utmost to maintain his integrity.
9. A statistician authorizing a survey assures himself of the necessity of the work and of the likelihood of obtaining significant results.
10. He does not pick his figures to satisfy the social or economic or political views of any special pleaders.
11. A statistician trains his subordinates not only in competence but also in intellectual honesty, and by his example as well as by formal or informal training instills in them the principles of this code of ethics.
12. A teacher of statistics trains his students to look for the meanings which lie behind figures, and to use statistics honestly. He indoctrinates them with the highest ethical standards.

Two surveys were carried out following the Ad Hoc Committee on Statistical Standards’s recommendation that the interest among ASA members for a code be ascertained. The first, a pilot survey performed for the Boston Chapter of ASA, indicated that perhaps only one-third of the chapter membership was “strongly in favor” of a code of ethics (Ad Hoc Committee on Statistical Standards 1954b). The results of the second survey, which included all of the 34 chapters of ASA organized by the early 1950’s, indicated that only 21 of the chapters were in favor of standards (Ad Hoc Committee to Explore Opinion on Standards 1956). The Ad Hoc Committee to Explore Opinion on Standards recommended, therefore, “that the Association defer action until there is more interest in formulating standards.” With this recommendation, the official ASA interest in establishing a set of professional standards waned, although publications continued over the next 20 years to deal with issues of statistical ethics.

Huff’s classic *How to Lie with Statistics*, a compendium of statistical chicanery that clearly outlined specifics of the “thou shalt nots” of Brown’s (1952) and Freeman’s (1952) exhortations to find the truth, was published in 1954. Whether the impact of this work on the public’s view of statisticians was negative or positive is difficult to assess, although Freeman (1963) was inclined some 10 years hence to lament that “there is a widespread feeling among laymen . . . that a statistician’s skill is to be purchased to prove with his figures a misnamed ‘conclusion.’ With this feeling goes distrust of the figures we statisticians produce and a questioning of the integrity of our profession.” He suggested that the development of a statement of principles would help in changing this attitude of laymen and even some statisticians, towards the use and misuse of figures, by displaying the ideals of the profession for all to see and hopefully understand. He cautioned, however, that righteousness and integrity without diplomacy might be an unproductive stance. He described 11 examples in which a statistician was in the position of being (as in Freeman’s (1952) statement of The Statistician’s Principles) “surrounded by the clamor of the marketplace or of the political arena.” In eight of the eleven cases cited, the statistician did not “wrap himself in a cloak of

moral righteousness and reach for a martyr's crown." but rather used diplomatic means to maintain his integrity.

Deming (1965) in his special invited address to the Institute of Mathematical Statistics in 1958 noted the ever-increasing complexity of statistical theory and that "statistical theory does not provide a road-map toward effective use of itself." He proposed, as an aid to statisticians in making effective use of their knowledge, an extensive set of principles that clearly defined the responsibilities of the statistician to the client and, conversely, the client to the statistician. While the comprehensive details of Deming's division of responsibilities are directed toward the areas of sampling and survey design, they can be easily modified to suit other applications. Deming strongly suggested a nonadvocacy role for the statistician by taking the position that "the statistician should not recommend to the client that he take any specific administrative action or policy. . . . The statistician, if he were to make recommendations for decision, would cease to be a statistician."

Gibbons (1973) also presented a case for the development of a set of standards. She observed that the ideal neutral role of a statistician may come into conflict with the statistician's responsibilities to his employer and "conflicts can arise because the statistician is under pressure to play the role of an advocate." She argued that "the only type of countervailing power in sight which holds any promise of being effective against improper pressure by employers is the power of professionalism" and that "the accomplishment of the objective of respect for the statistician's professional integrity would be considerably improved if the professional ideals and limitations were clearly enunciated."

In a paper related to ethics, Bross (1976) gives 10 commandments for speaking to the public about statistics and science. The final commandment is self-explanatory: "Tell the public the truth, the whole truth, and nothing but the truth to the best of your ability."

Several ethical problems in fields of statistical application have received much attention over the past decade, such as the ethical propriety of randomized clinical trials (Atkins 1966, Byar et al. 1976, Mike and Good 1977, Gilbert, McPeck, and Mosteller 1977, Levine and Lebacqz 1979), and the protection of the confidentiality of personal data, (Frankel 1976, Ad Hoc Committee on Privacy and Confidentiality 1977, Durbin 1979, Dalenius 1979). These issues do not relate solely to the honesty or professional integrity of an individual statistician. These are problem areas that involve the conflict of the inherent rights of patients or respondents with the needs of society as a whole (e.g., the government's need to derive information, the need for progress in medicine). Since there may be disagreements on how to approach these matters, even among the most noble of our profession, the question is raised as to whether a code of statistical principles can effectively deal with such areas of concern. If so, can it allow for the honest disagreement among statisticians with equal integrity?

Altman (1980) explicitly defined incompetence in the

use of statistical design or analysis in medical research as unethical, since statistically substandard research causes:

1. the misuse of patients by exposing them to unjustified risk and inconvenience;
2. the misuse of resources, including the researchers' time, which could be better employed on more valuable activities; and
3. the consequence of publishing misleading results, which may include the carrying out of unnecessary further work.

He noted the results of Schor and Karten (1966), which found that only 28 percent of a large series of analytical medical studies reported in several journals were judged to be statistically acceptable. This point raises the issue of whether a code of statistical principles could be effective without certification to assure basic levels of competence.

Anderson (1981), speaking against a formal code of ethics, suggested that unethical behavior "is often not a matter of statisticians choosing to violate accepted principles of right or wrong. They do so out of ignorance—or incompetence." He suggests that instead of a code that could "set the stage for witch hunts and possibly even for indoctrination," that the Association have a "formalized activity of helping young statisticians develop a 'professional personality' . . . ." This personality would involve at a minimum the recognition of the "human consequences of professional decisions."

Jowell (1981) presented three possible motives for a professional code for statisticians. A code "might serve as a defense against improper pressure;" . . . "it might also serve to disabuse those who view statistics as a mischievous and meddlesome discipline that harms rather than promotes society's interests"; and the most obvious motive, "the creation of a stronger professional identity among statisticians." He rejected the concepts of an *aspirational code* ("expression of unattainable ideals") or a *regulatory code* ("rules to govern behaviour, based on the premise that there are universal (and enforceable) models of appropriate practice") and instead prescribed an *educational code*. Such a code "would seek to describe and explain professional norms, expose inherent conflicts and give guidance on possible approaches to their resolution. Its aim would be to ensure that individual ethical decisions are informed by professional experience, not governed by professional authority." Jowell admits, however, that such a code may "ultimately defy formulation."

The interest within the ASA in a professional code for statisticians was rekindled in the late 1970's. A letter from Professor Jerzy Neyman to the Board of Directors regarding expulsion of members who knowingly falsify data was discussed at the August 1976 meeting of the Board. This was followed by a letter from Professor C. Terrence Ireland in September 1976 to Executive Director Fred C. Leone and members of the Board, requesting the establishment of an ad hoc committee to study questions of ethics. At the January 1977 meeting of the Board, the Ad Hoc Committee on Code of Conduct was established.<sup>2</sup> During the next three years under the chairmanship of Professor Ireland, an *interim* Code of Conduct was developed and then published

twice in *Amstat News* (Ad Hoc Committee on Code of Conduct 1980,1981) for review and recommendations from the membership and chapters of the Association. The version of the Code presented in this issue takes into account the extensive input from members, chapters, and the Board of Directors of ASA.

The Board of Directors approved the current revision at its August 1981 meeting on a three-year trial basis and directed that the Code be published as a report of the Ad Hoc Committee. In addition, the Board approved the continuation of an ad hoc committee under the new title of Ad Hoc Committee on Professional Ethics (1981-84).<sup>3</sup> This Committee will be responsible for any modifications of the Code during the three-year trial period, after which the Board will make a final decision on whether to accept it as a statement of principles of the Association. The mechanism by which the Board will determine whether to accept the guidelines has not yet been addressed. The Board could simply vote on the issue or perhaps initiate a survey of the membership of ASA or of the chapters of ASA to determine the sentiment of the membership as a whole.

### 3. ACKNOWLEDGMENTS

It is evident from the diversity of opinion expressed over the past three decades concerning the usefulness, the form, and the content of a professional code for statisticians that the generation of a global consensus will be extremely difficult. The Ad Hoc Committee on Code of Conduct, under the able direction of Professor Ireland, has considered an extraordinary amount of input from members, chapters, and the Board of Directors in the development of this trial document. It is to the enormous credit of this committee that we have this document before us. The members of the Association are indebted to the committee for its perseverance, hard work, and good humor during this process.

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<sup>2</sup>The members of the Ad Hoc Committee on Code of Conduct were C. Terrence Ireland, Chairman; Tore Dalenius; Lester R. Frankel; Lee-Ann Hayek; Sidney Hollander; William G. Madow; Eli S. Marks; and Frederick J. Scheuren.

<sup>3</sup>The members of the Ad Hoc Committee on Professional Ethics are C. Terrence Ireland, Chairman; Lee-Ann Hayek, Vice-Chair; Tore Dalenius; Sidney Hollander; Charles R. Mann; Eli S. Marks; Janace S. Pierce; Frederick J. Scheuren; and William Seltzer.