THE STATISTICAL CONSULTANT

Subsection on Statistical Consulting Education
Section on Statistical Education
American Statistical Association

Janice Derr, Editor
Ron Wasserstein, Managing Editor
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SUBSECTION ACTIVITIES IN ANAHEIM

Our subsection is responding to the challenges of the new ASA constitution. One change is that the minutes of the Subsection business meeting held at the ASA meetings in Anaheim, CA this past August, will be printed in the AmStat News rather than in this newsletter. However, here are a few highlights:

As of January 1, 1991, subsections will become sections. Dues for sections will be collected through the ASA. Dues for our Section on Statistical Consulting Education were set at $6.00 per year for members of the section, of which $1.00 goes to the ASA and the remainder will help to defray newsletter costs. A newsletter subscription fee was set at $10.00 for non-section members. Since our treasurer, Bill Bridges, reported that only 153 of our 406 subscribers paid their subscriptions, it is hoped that this new method of collecting fees will be more effective.

As for the newsletter, The Statistical Consulting Center at Penn State University has offered to underwrite production costs until sufficient subscription fees have been collected to operate in the black again. Currently there is $132.00 in the treasury. The cost of producing and mailing the last three newsletters was $200.91 for Vol6#3, $242.48 for Vol7#1 (including the Directory of Statistical Consulting Units), and $112.85 for Vol7#2.

We encourage all of you to continue your subscription by becoming members of our section in 1991! However, please note that you may continue to receive the newsletter if you are not a member of the ASA by paying the $10.00 subscription fee.

SURVEY RESULTS ON CERTIFICATION

Janice Derr, Penn State University

In April, 1990, a questionnaire concerning the certification of statisticians was sent out to all 360 of the U.S. subscribers of **The Statistical Consultant**. The responses from this survey provided material for my talk at the ASA meetings in the invited session "Should Certification Be an Option for Statistical Practitioners?" organized by James Boen, University of Minnesota. I want to thank all 232 of you who took the time to respond to this questionnaire. There were many thoughtful comments, and it was very interesting to read and summarize the responses. Here is a summary of the responses:

I. Respondent Profile:

-97% received an academic degree in Statistics or related field;

-84% have the Ph.D. degree;

-18 years was the mean number of years working as a statistician, with a standard deviation of 8 and a range of 0 to 45 years;

-82% reported academic occupations, with 10% in industry and the remainder in government, self-employed, or "other";

-35% was the mean percentage of working activity reported as spent in statistical consulting, with a range of 0 - 100%;

-67% reported private consulting in addition to their regular job.

II. Opinion about certification:

-143 of the respondents, or 62%, said "Yes" to the question: "Do you think that the ASA should implement some form of certification?" 80 said "No" and 9 did not reply.

Respondents were then invited to describe what type of certification process they favored. The number of people answering the subsequent questions ranged from 133 to 150.

-78% felt certification should be voluntary (as opposed to mandatory).

-69% felt that reporting education should be done with transcripts, 27% felt that self-report of education was sufficient, and 4% felt that no eduction report should be required.

-56% felt that names of references should be sent in with the application for certification, 22% felt that letters of references should be sent in, and 22% felt that references should not be required.

-94% felt that criteria for certification should be based on education, 89% felt that criteria should be based on experience, and 51% felt that criteria should not be based on results of standardized tests.

-65% felt that levels of certification should be put into place.

-84% felt that removal of certification should be possible.

-60% felt that certified statisticians should be reviewed periodically to maintain certification.

-62% felt that there should be a suggested code of conduct for certified statisticians; 37% felt this code should be required, and 1% felt there should be no code of conduct.

-51% felt that a certification panel should be able to provide advice in disputes between a certified statistician and a client or employer, 27% were opposed to any arbitration function, and 22% felt there should be a formal arbitration procedure.

Finally, respondents were invited to write down any further comments about certification. I had all these comments transcribed into a document to give to the ASA Committee on Certification, along with a copy of these results. I want to acknowledge the efforts of Aref Dajani in preparing the questionnaire.

CERTIFICATION MADE EASY

Editorial -- Janice Derr

The ASA has appointed an ad hoc committee to study certification. The charge to this committee is to conduct a formal study of the costs and benefits of certification of statisticians, and produce a report to the ASA based on its findings. One outcome of this committee's efforts was the invited session at the ANAheim meetings, "Should Certification Be an Option for Statistical Practitioners?" When Dr. Boen invited me to speak at this session, I decided to conduct an opinion survey of the readers of **The Statistical Consultant**. My findings, reported above, convinced me that certification was desired by many but also that many had serious doubts about whether it could be implemented effectively. A commonly-occurring theme in the open-ended section of the survey forms was that certification would be too difficult to implement. I put these results together with an interview I had conducted in England with Dr. Tony Greenfield, one of the administrators for the Institute

of Statisticians, and I concluded that with a little creative problem-solving, certification could be made available to those who desired it, with a minimum of "start-up" woes and divisiveness within the ASA.

The Institute of Statisticians (IoS) is an international, not-for-profit organization based in Great Britain which has been administering a certification process for statisticians for many years. The features of this IoS certification are very similar to those which the majority of respondents to our survey favored: (a) It is voluntary. (b) There are levels of certification ("Member" and "Fellow") based on education and experience, and these criteria are defined and described in the applications booklet provided by the Institute. Letters of reference are also required in the application for membership. (c) Fellows and Members of the IoS must sign and abide by a Professional Code of Conduct. The sixteen items in the code defines professional standards for the Institute. (d) The Institute may assist in resolving conflicts between a member and his or her employer.

I believe that the ASA should form a liaison with the IoS in some way that would provide a certification process for ASA members who wish it. I think this would be a very positive action, forming an international link to statisticians everywhere, and a conduit through which to share successful programs, organizational structures, and experiences. It is difficult to see how such a liaison would diminish in any way the ASA's role in meeting the needs of its membership. I strongly encourage the ASA and its committee on certification to contact the IoS and develop a satisfactory program for certification.

HELP FOR STATISTICAL CONSULTANTS VIA ELECTRONIC MAIL

Terry Smith, Queen's University at Kingston

Have you heard about the statistical consulting LISTSERV facility available on mainframe computers with BITNET connections?

Messages distributed to subscribers of the STAT-L Statistical Consulting list by a "list server" contain queries about statistical problems ranging from the routine to the very challenging, as well as responses at a similar variety of levels. Sometimes responses will be sent directly to the person with the query rather than to the whole list, and that person may distribute a summary of responses to the list. Some queries are answered quickly. Others evolve into lengthy discussions. A recent question about using PC spreadsheets to teach elementary statistics elicited a torrent of responses, some of them highly charged with strong convictions, some of them carefully reasoned and very helpful.

If you are on a VM/CMS system, you can subscribe to STAT-L using the command string: tell listserv@mcgill1 subscribe STAT-L Your Real Name
Apparently, VMS systems require a variant: send listserv@mcgill1 subscribe STAT-L Your real name

The first of these worked for me. If you are on some other type of system, you can try to subscribe (no guarantees) by sending the following e-mail message:
subscribe STAT-L Your Real Name
to the address: Listserv@mcgill1.bitnet
Once you are registered as a subscriber, you can send messages to the whole distribution list by addressing them to: stat-1@mcgill1.bitnet

There are other lists relating to statistics. A recent submission to the STAT-L list by Nelson Pardee mentions the following addresses with corresponding numbers of subscribers:

BMDP-L@MCGILL1.BITNET	132
SAS-L@VTVM2.BITNET	912
SOS-DATA@UNCVM1.BITNET	232
SPSSX-L@OHSTVMA.BITNET	493
STAT-L@MCGILL1.BITNET	441

The method of subscribing to these follows the pattern described above for STAT-L, with the obvious changes.

Yet another list, S-news, relating to the statistical programming language, S, is accessed by a different system, available if your system is flexible about non-Bitnet addresses. To subscribe, send an e-mail message requesting to be added to the mailing list to the following address (again, no guarantees):
s-news@stat.wisc.edu

These list are worth investigating. If you are persistent, you will come across some nuggets of real value among the daily arrivals. You may even get help finding that elusive reference. Perhaps your role will be to help out a colleague in need or to add a note of clarity to an discussion that seems "off the rails". Just be prepared for an avalanche of mail that will soon take over your disk storage space unless you are ruthless about discarding unwanted messages!

THE STATISTICAL REVIEW PROGRAM IN THE AMERICAN JOURNAL OF PSYCHIATRY

John J. Bartko, Ph.D., Lee Gurel, Ph.D. Statistical Editors, AJP

Working in the mental health field we have been called upon over the years to review many articles for their statistical content. This includes manuscripts for The American Journal of Psychiatry (AJP) the foremost journal of the American Psychiatric Association (APA). In 1980 I (JJB) had the privilege of meeting the editor of the AJP and from our meeting began a more formalized statistical review process for the Journal. Initially all submitted manuscripts were reviewed for compliance with statistical standards only if the primary reviewers requested a formal statistical review. The statistical review duties were shared with Lee Gurel, Ph.D.

In 1985 the Journal published an editorial explaining the decision to require the standard deviation (SD) not standard error of the mean (SEM) in a $\pm$ b, where a is the arithmetic mean. There were several motivations for this, one being that often one has to be resourceful in unraveling a and b. (Bailar, 1988). The SD was argued on several grounds. One, that many investigators tended to report the SEM rather than the SD because the former was smaller and "looked better". Secondly, the SD, while conveying spread in the data also provides for a pedagogical exercise in that authors may be forced to think about the differences and ask their statisticians for guidance thus promoting the communication process between them. There were dissenting letters, of course, some from statisticians.

This referral review process continued until the middle to late 80's. The two of us (JJB and LG) were reviewing about 50 manuscripts a year. Discussions began about the feasibility of a statistical review of all manuscripts not rejected outright. These discussions were partially prompted by the appearance of articles reporting statistical errors in publications (White, 1979). We initiated such a program in 1988 by announcing a new program of statistical review in an editorial. The editor of the Journal, John C. Nemiah, M.D. and the tow, now to be formally named statistical editors, Lee Gurel Ph.D. and myself had a formidable task of enlisting a much larger cadre of statistical reviewers having good communication credentials, as well as being ready and willing to provide a service.

Currently statistical review is a triage process. After subject matter (primary) review, each manuscript not rejected outright is seen by one of the statistical editors who performs a statistical review or elects to have it reviewed by one of the statistical reviewers. To facilitate this procedure a four page statistical review form has been designed which attempts to guide the reviewer into focusing on those statistical items we found most egregiously violated by author-investigators. The form is a check list, but more importantly it has a section for confidential comments to the editor and a separate section for the attention of the authors.

Statistical reviewers address such research design issues as appropriate randomization, the relevance of comparison groups and bias in sample selections and attrition. More generally they will seek to determine whether the methodology and its attendant statistical analysis are germane to explicitly and clearly stated scientific aims. We ask reviewers to consider whether the conclusions of a manuscript are supported by the data. They are also urged to comment on findings that have great statistical significance in a technical sense but are only of limited clinical significance. Reviewers are expected to offer constructive suggestions to the authors to remedy presentations. They are asked to examine degree of conformity with the Journal's reporting requirements, such as names of statistical tests used, degrees of freedom (in the age of software statistics it is not uncommon, for example, for authors to be unaware that the F statistic has both numerator and denominator df).

When completed, usually within several weeks, the statistical review is assembled with the primary reviews and the package is sent to the author. Currently under triage each statistical editor manages about 300 manuscripts per year.

In the spirit of Deming the procedure is dynamic. We work toward improvement. For example, we have introduced statistical guidelines into the Journal's four page Information for Contributors section. Statistical reviewers are expected to be familiar with this section, whose guidelines for statistical reporting of scientific results exceed in number the requirements for "reporting references". We also have an extensive section for guidance in the preparation of tables, figures and graphics.

We are proud of the statistical review procedure and are unaware of any other Journal which has such a mechanism for ensuring quality. We are also pleased with our panel of statistical reviewers. They each review about four manuscripts per year, although some reviewers are willing to do more. Statistical reviewers are named and given a formal vote of appreciation by the editor, Dr. Nemiah, in the January issue of the Journal. We welcome the addition of panelists to the statistical reviewer group, and extend thanks to all of you (about a dozen) who recently responded to a note about this review process appearing in **The Statistical Consultant.**

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BRIEF CONSULTATIONS CAN BE WORTHWHILE[1]

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Statistical methods are almost always developed in response to applications, with generalizations expanding the range of their uses beyond their original motivation. Examples form the basis for general theories--examples are frequently complex and specific. We can hardly doubt the contributions made to statistical theory and practice by substantial and continuing data analyses, but the role of the infrequent and brief consultation may have been overlooked. Let me illustrate with a few examples from my consulting experience.

For seventeen years I have been Professor of Child Psychiatry and Biostatistics. I am the primary statistics consultant for about 100 faculty members and their graduate and postdoctoral students. Our research is mostly on mental health of children, including mental illness and mental retardation. Our statistical applications come from in many disciplines--biological sciences like physiology, anatomy, biochemistry and genetics; behavioral sciences like psychology and education; social sciences like anthropology, sociology and social psychology; and the medical sciences found in psychiatry.

One of the unusual features of my consultations is that I know most of my clients, or their mentors, personally. Thus, I don't have to spend a lot of time becoming acquainted with the general aspects of their research, but only with the specific details of a current project. Another feature is that my colleagues are generally quite astute in the application of statistics, especially in their own research fields. Combined, these lead to many brief consultations, often occurring in the halls or in the process of other business. Some of these consultations are not addressed in detail at the initial encounter, but some are, and it is possible to provide brief and timely help which is not only complete and valid, but also mutually rewarding.

In an academic setting, we measure our contributions by traditional academic criteria--teaching, research and service. A well-balanced academic record contains aspects of each. I have found that my role as a consultant gives me the opportunity to develop breadth of contributions, and that brief consultations constitute a valuable component of that breadth. Let me give three examples, one illustrating each of the criteria.

My first example gave me valuable teaching material. I was teaching a graduate course in linear models, and most of the term was concerned with random effects models. Shortly after having discussed the several methods of estimating variance components and having reviewed the standard package programs, I needed a good example with actual data--data which had not been selected in order to provide illustration of how well or poorly a method worked, but data with enough complexity in its design to illustrate statistical principles. The afternoon before the example was needed, a colleague presented me with a classic--two classes in each of two schools receiving an experimental instruction program, two classes in the same schools receiving a standard program, and various numbers of students in the classes, some boys and some girls. There was some suspicion that the effectiveness of the program might be gender related, thus there was a fixed effect covariate, the gender, associated with each of the students. My client saw this as a crossed design, some male students getting the experimental program, etc. In fact, the basic unit for evaluating the effect of program was the class, and in the absence of gender effects a fairly simple analysis would give tests and estimates of the variance components. The presence of gender effects, however, made the illustration of ML and REML computations more challenging, and thus of

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[1]. Presented at the August 1990 Joint Statistical Meetings in Anaheim, California.

interest to my class. Fortunately, one of my students was also one of my graduate assistants, so he was able to set up the necessary computer runs to meet the pedagogical and application needs. The client received a corrected (notice that I am not so bold as to say correct) analysis, and I received a useful illustration.

My second example illustrates service to my department. A colleague of long standing who had just received a referee's report suggesting that it would be necessary to use a chi-square test to measure the statistical validity of his conclusions. While my colleague and I did not agree with the referee and editor that the test was necessary, we both regarded it as scientific window dressing, we recognized that his results would not appear in this journal unless the referee was appeased. I was therefore called upon to design the correct analysis, and the apparent results were supported by a simple contingency table--not the one suggested by the referee. The paper was published. The availability of a statistician for designing the statistical interpretation facilitated the publication of the research results. If my colleague had had to seek out an unknown statistician, he would have had to explain the context of the research and the reasoning behind the referee's report before the consultation could commence. On the other hand, since I was familiar with both the context and the style of the particular journal, I was able to assist immediately and effectively. The benefit to my colleague was that his paper was published, the benefit to me was that our reputation for responsiveness to urgent requests was enhanced. This incident has been cited, for example, in support of our requests for continuing financial support, in both university and grant funding.

Finally, some brief consultations lead to interesting long term consultation with substantial statistical issues and subsequently to research in statistical methods. My office is on the top floor of a tall building, so I frequently see my colleagues in the elevators. One day several years ago while riding from the first floor to the fourth, one of my friends asked if I knew anything about principal component analysis. When I agreed that I did know a little, he asked if I had time "for a few quick questions". I was able to respond to his initial inquiries briefly and directly, but what began as a brief consultation has evolved into a long term collaboration which has produced about ten publications, two of which have been primarily statistical in nature. The simple inquiry and brief meeting piqued my interest in the subject and started me on a line of my own research which has in turn supported my colleague's investigations.

Despite advantages, there are drawbacks to brief consultations. Providing short term consultation is often a nuisance. I sometimes wonder how I can get any personal thinking done in the thirty days before the periodic grant application deadlines. The spontaneity which is essential for effective encounters detracts from the effectiveness of a statistician who needs to concentrate on more complex tasks. Providing short term consultation is also expensive. My facility and personnel are maintained by our department (Psychiatry) so that we can support research in the department. Some of the support comes from university funds, but most comes from extramural sources with specific interests. Thus, it is difficult to provide time and resources in short blocks unless the support goes to someone who is in effect paying for it. Providing effective short term support increases demand, and without long term institutional commitment it is often difficult to obtain just and equitable compensation.

Providing short term support can be rewarding to both statistician and client. The examples present three clients who benefitted from the presence of a statistician. In addition to the intrinsic satisfaction of having contributed to the improvement of research projects, I was able to gain material for my teaching, to provide support of the my institution, and to identify directions for my personal research in statistical methodology. Thus, all three of these encounters were worthwhile to me.

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