THE STATISTICAL CONSULTANT

Section on Statistical Consulting
Murray K. Clayton, Editor
Winter 1996: Volume 13, No. 3

American Statistical Association

IN THIS ISSUE

Consultation in the Social Sciences: An Integrated Model for Training and Service

Richard F. Ittenbach
The University of Mississippi

Ya-Jung Tsai
Intel Corporation

Collin Billingsley
The University of Mississippi

Support for this research was provided in part by a grant from the Administration on Developmental Disabilities, United States Department of Health and Human Services (#07DD0282). *All correspondence regarding this manuscript should be addressed to Rick Ittenbach, Ph.D., School of Education, University of Mississippi, University, MS 38677. This paper was initially written while the first and second authors were at the University of Minnesota.*

Much has been written on the role of university based statistical consulting centers (e.g., Boen, 1982; Gibbons and Freund, 1980; Minton and Freund, 1977). Recent developments in statistical and research methodology combined with increased expectations of human service providers have required that researchers in the social sciences increase the integrity and sophistication of their research projects. As researchers in the social sciences begin using more complicated methods, the need for statistical consultants becomes much more acute (Gibbons and Freund, 1980; Minton and Freund, 1977), the subfield of developmental disabilities is a case in point.

One place that such consultants have been used is the University of Minnesota's Institute on Community Integration, a University Affiliated Program (UAP) for Persons with Developmental Disabilities. The Institute, one of the first located outside of a university medical center, is housed in the Department of Educational Psychology and, at the time of this writing, consisted of approximately 120

faculty, staff, and student research assistants from as many as 20 different academic disciplines across campus. "Through its program of interdisciplinary training, service, research, and dissemination, the Institute on Community Integration seeks to prevent and reduce the limiting effects of disabilities" (Institute on Community Integration, 1994, p. 1). Within the Institute is a formally organized and budgeted Technical Assistance Center (TAC), the purpose of which is to provide Institute staff with their own resource for statistical and computer assistance using a model that emphasizes the service and training needs of graduate students in the social sciences.

The Service-Training Model

The leadership of the Institute continues to be committed to the training of students and researchers in the field of developmental disabilities. At the time of this writing, the annual budget and the number of persons needed to carry out the research agenda of the Institute had grown nearly nine fold ($0.4 million to $3.6 million; 15 persons to 120 persons), leading to the TAC's half-time faculty-level coordinator and 7 doctoral level student consultants (FTEs = 2.5). Conscious efforts were made to retain students as central figures in the TAC for several reasons: knowledge base of the students, philosophical needs of Institute personnel to train the next generation of researchers in the field of developmental disabilities, and lowered personnel costs.

Service Component

While the leadership of the Institute is committed to offering training experiences that complement the instruction of students in graduate training programs at the University, expectations placed on TAC consultants are those of practicing professionals rather than simply students wishing to acquire technical skills. All consultants are expected to be knowledgeable in their respective disciplines and familiar with relevant methodology. Each is required to accept responsibility for at least one organizational task that supports the upkeep of the TAC (e.g., continuing education, evaluation of services, hardware/software records, TAC library, brown-bag series).

Data Analysis

What used to be a data drop-off center with only one analyst has evolved into a consultation center of collaborators and problem solvers. Though each consultant is assigned to work with as many as two to four project teams at any one time, supervision of the consultants remains with the coordinator of the TAC, a faculty-level research psychologist. The greatest percentage of analyses are traditional ANOVA and regression-based designs though more complex analyses are being requested with increasing frequency. Formal evaluations are conducted through quarterly written reports by the TAC coordinator using information obtained from the various project directors. Allied responsibilities such as coding, data entry, and programming are no longer formal roles of the student consultants and are contracted out to staff of the St. Paul Computing Center.

Design Consultation

As the size and scope of projects have increased, so has the need to involve student consultants at the front end of projects. For some projects this means prior to data collection, for others, prior to submission of the written grant proposal. As Boen and Zahn (1982) have stated, the fields and perspectives of statistics are so varied that few statisticians are knowledgeable about all designs. Difficult designs are handled either jointly among the consultants, through consultation with the coordinator, or openly at the monthly TAC staff meetings. Student consultants are encouraged to serve as each project team's technical arbiter.

With a limited number of hours available for a given project and as many as twenty different state- and federally-funded projects re-

quiring technical help at any one time, the shift of responsibility for low-level analyses must, out of necessity, be made to other team members who are more closely aligned with the content area. That is, to team members who, while not members of the TAC staff and who typically do not have statistical training beyond that of most graduate students in the social sciences, serve primarily as investigators on the various project teams but who also have the skills to conduct routine or procedural analyses. These persons often work under the instruction of and in union with a TAC staff member. The shift is as defensible from an organizational standpoint as a pedagogical one when one considers the need to empower other team members to assume a greater share of the responsibility for their analyses.

Education

Because institute-sponsored research is conducted in a university affiliated facility that incorporates faculty, staff, and students from many different disciplines (e.g., architecture, pediatrics, nursing, public affairs, social work), the need for continuing education of TAC members inside and outside of their original and primary disciplines is paramount. Compounding the difficulty of a need to know about related areas is an exponentially growing knowledge base that limits greatly those who fail to keep up (Kirk, 1991).

To keep Institute staff abreast of recent developments in technical issues and techniques, one student consultant is responsible for keeping Institute personnel up to date on technical meetings, programs, or short courses on campus or in the Minneapolis–St. Paul area. Another student consultant coordinates the TAC brown-bag series of university and community speakers who present information on technical topics of interest once a month. Recently, topics ranged from E-mail to Q-methodology. Because it is recognized that formal coursework and experiences at the Institute cannot account for all learning in one's training as a consultant, students are allowed $100 toward pertinent short courses offered at the University or in the community.

Training Component

No longer can a single academic department provide students with all of the tools necessary to become competent researchers (Holden, 1991; Lehoczky, 1994). For research to be truly interdisciplinary, researchers must work together over extended periods of time sharing with and benefitting from one another's work (IMS Panel on Cross-Disciplinary Research in the Statistical Sciences, 1990). That is precisely the rationale behind the Administration on Developmental Disabilities funding of UAPs and the rationale behind the TAC's emphasis on fielding a team of student consultants from seemingly disparate disciplines (e.g. computer science, health information systems, economics, and special education). Training researchers to be interdisciplinary in thought and practice must occur while they are in school.

Measurement

Student consultants are expected to know as much about the fundamentals of measurement as the fundamentals of statistics. Different from the natural sciences in which measurement patterns are defined by the laws of nature, educational and psychological constructs, class action lawsuits, and special attention to protected populations have all shaped the means by which educational and psychological phenomena are measured and analyzed. Sound designs must be built on sound data with sound data originating from valid and reliable instruments.

Statistics

Student consultants are not considered for a position in the TAC unless they have had a *minimum* of one year of graduate level statistics courses, a year's worth of measurement

courses, experience with at least one programming language, and experience with one or more statistical packages (i.e., BMDP, SAS, SPSS). Some students have backgrounds in theoretical statistics, others in applied statistics, and all but one have had coursework in research design. Key factors in hiring student consultants are the unique skills and abilities each student brings to the TAC team. For example, as cost-benefit studies became more complicated a graduate student in applied economics was sought and hired. When programming and computer technology needs rose to levels beyond that of current staff, two graduate students with degrees in computer science were hired.

Working with People

Boen and Zahn (1982) and Kirk (1991) have reported at length the skills needed to work with people in a consultation relationship. Time, patience, understanding, and empathy are all essential skills for collaborative consultation, but none can take the place of technical competence in pursuit of a scientific *truth* (Strickland, 1996). Technical competence is not taught at the Institute, only refined. Stegman (1985) has likened the role of a statistical consultant to that of a teacher, Hunter (1981) to that of a helper, roles with which graduate students in the social sciences in general and developmental disabilities in particular are relatively familiar. Particularly challenging to student consultants is the need to adjust to the various backgrounds of their clientele (Kirk, 1991; Stegman, 1985). While it is not uncommon for student consultants to know more about new methodologies than their clients, some clients simply want their analyses done a certain way. The consultants are instructed to negotiate their position on the basis of principle (Kirk, 1991); however, deferring to others who are in positions of authority or simply to get the job done is also a reality-based skill to be learned.

Equipment

All student consultants are expected to be familiar with the micro and mainframe systems at the University. More difficult has been bridging the gap between IBM-compatible and Apple systems. Finding persons who are proficient and willing to work on both types of systems has been difficult; however, the gap is narrowing as user friendly software, applications, and attitudes begin to soften. Frequent experience with viruses and computer crashes underscores the importance of routinely caring for one's data.

Dissemination

The students are hired with the explicit expectation that they will contribute to the UAP's mission of improving services and supports for persons with disabilities through training, service, and research. For some in the TAC that means writing books, others articles, and still others research monographs. To assist with this process and to facilitate the development of professional skills, students are reimbursed for expenses incurred while presenting Institute research at one professional meeting per year. Preparation for such responsibilities comes in regularly scheduled team meetings where the students receive practice in displaying, reporting, and discussing analyses. Different from professional meetings, perhaps, but no less important as one learns the fundamentals of synthesizing and sharing technical information (Freeman, Gonzalez, Hoaglin, and Kilss, 1983).

Conclusion

Statistical consultation is a multifaceted operation requiring sound logic, insightful analytical training, and client centered, interpersonal communication skills. A model was presented here that builds on the basics of consultation services offered in other disciplines and now applies them to the social sciences in a way that emphasizes and hopefully optimizes the

service and training needs of our newest professionals.

References

Boen, J. R. (1982), "A self-supporting university statistical consulting center," *The American Statistician*, 36, 321-325.

Boen, J. and Zahn, D. (1982), *The Human Side of Statistical Consulting*, Belmont, CA: Lifetime Learning.

Freeman, D. H., Gonzalez, M. E., Hoaglin, D. C., and Kilss, B. A. (1983), "Presenting statistical papers," *The American Statistician*, 37, 106-110.

Gibbons, J. D., and Freund, R. J. (1980), "Organizations for statistical consulting at colleges and universities," *The American Statistician*, 34, 140-145.

Holden, C. (1991), "Career trends for the '90s," *Science*, 252, 1110-1117.

Hunter, W. G. (1981), "The practice of statistics: The real world is an idea whose time has come," *The American Statistician*, 35, 72-76.

IMS panel on Cross-Disciplinary Research in the Statistical Sciences (1990), "Cross-disciplinary research in the statistical sciences," *Statistical Science*, 5, 121-146.

Institute on Community Integration (1994), "Annual report: July 1, 1993 – June 30, 1994," Minneapolis, MN: University of Minnesota, Institute on Community Integration (UAP).

Kirk, R. E. (1991), "Statistical consulting in a university: Dealing with people and other challenges," *The American Statistician*, 45, 28-34.

Lehoczky, J. (1994), "Modernizing statistics Ph.D. programs," *The American Statistician*, 49, 12-17.

Minton, P. D., and Freund, R. J. (1977), "Organization for the conduct of statistical activities in colleges and universities," *The American Statistician*, 31, 113-117.

Stegman, C. E. (1985), "Statistical consulting in the university: A faculty member's perspective," *Journal of Educational Statistics*, 10, 269-282.

Strickland, H. (1996), "The nature of statistical consulting," *The Statistical Consultant*, 13, 2-5.

Earning by Numbers — Starting A Statistical Consultancy

John Shade
GOOD DATA
Box 53
Woodmill Road, Dunfermline KY12 7UX
Scotland

The large efforts put into quality improvement by leading manufacturing companies in the 1980's had statistical process control and other systematic uses of data as part of the toolkit seen as all but essential for fast progress. The aim was to get as many employees as possible into using basic statistical tools to help inspire, prioritize, and assist with improvement efforts. Some people were hired (I was one) for a new kind of job: to be statistical evangelists. Their company and perhaps even their boss may have had only the vaguest idea of what statisticians do, but they urged them to go forth and do good works. From my own experience during that period, I know some didn't survive, some found more conven-

tional roles to fill, and while some still thrive as internal consultants, some will have left to set up business on their own. I became one of these last types when I left a company where I had spent 8 years. The company had been an excellent place to work. Leaving it felt like climbing down the side of a fast and powerful vessel to get into a home-made dinghy of uncertain worth. But that was, after all, an early part of the hoped-for excitement.

I formed GOOD DATA in 1992, to provide down-to-earth advice and analysis in industrial statistics. I liked having a business name, and felt that John Shade and Associates was too self-promoting and somehow inappropriate for a humble and undistinguished practitioner. The name I chose appealed because in so much of my work, and in the work I anticipated doing, there was rarely a need for sophisticated analysis — often just the display and a discussion of the data and occasionally some readily derived items (such as various statistical intervals, control charts, analyses of means, and power calculations) would suffice, provided that the data was good enough for the purpose, and *that a clear and confident grasp of relevant statistical ideas was available.*

One of the numerous thoughts that finally made me go into business was the realization that some of what I did was clearly and obviously very valuable to my clients, and that it was not at all implausible that they would have spent money on it. In the company, though, I was a resource free at the point of use, and so cost/benefit was never an issue for those who called. The goal of spreading enlightenment made me hate to turn away anyone who showed some interest. (Another soul to be saved!) My workload grew and grew. As an erstwhile physicist, my statistics were largely self-taught at that time. Some queries from engineers or others would send me into days of intense study and calculation, perhaps to come up with some fairly modest response once I felt that I had the topic clear enough in my own head. After a few years (something like three or four I guess), this kind of pressure grew easier as I acquired a stock of relevant experience and insight, and could often supply replies or other contributions all but immediately. The difference in effectiveness when you have truly grasped some topic (as opposed to merely being aware of it, or of having read past it smoothly enough in some textbook) is phenomenal. My greatest delight was when I could give someone a truly helpful on-the-spot answer to some query or make a real-time contribution on a tricky topic in some meeting. I also came to feel that the metaphorical blood, sweat and tears necessary for me to really grasp something was out of all proportion to the final benefit if only used once or twice. Thus for many engineers or managers, it does not make sense for them to master a given topic in statistics. They would be better off putting that effort into the subject matter and making use of a statistical specialist who could be proactive in identifying what was called for (especially if he or she also shares their way of thinking about and reformulating problems). Thus it gradually dawned on me that applied statistics was ideal for consultancy: a user could go crazy trying to get things clear for themselves, and could resent the time required to do so. I never doubted that the work was there to be done. I believe it exists on a scale out of all proportion to the number of people currently competent to do it. The only problem is that the expressed demand for statistical work may be tiny compared to this supposed need, and I did not know how I would get on at marketing.

I also liked the idea of having explicit financial charges for my services. They would surely act as a filter to reduce the amount of work being on the table at any time, plus of course I had the prerogative of refusing new work or of doing no work from time to time. But what to charge, and how to charge it? Since many people have only the vaguest idea of what statisticians do or how long it will take them, it seemed to me to be desirable to make fees as predictable as possible. Hence I usually offer firm quotations for work, along with firm

deadlines. This combination caused me much grief in my first year of business simply because not only did I always underestimate the time required for some task, I sometimes did so in a big way. The kind that saw me in a sleeping bag on the study floor getting 3 or 4 hours rest in between intense sessions at the computer, deadline already missed and apologized for and a monster of a data analysis all around me. The crucial process improvement I made here, in my second year of business, was to decide to never ever again offer a fixed price on a *complete* data analysis. Instead I began offering a free first look (Stage Zero), followed by a firm price for an initial data analysis (Stage 1: informal, exploratory), and only after that will I offer a firm price for a further analysis stage if it looks to be required (Stage 2: further analysis). So far this has worked pretty well. Although I still tend to underestimate, the risks of getting it badly wrong seem to have been reduced.

The charge rate I used in my first year or so was £384 per day. Given 100 fee-earning days in a year, that is enough to get by on after all the usual costs are deducted, but not enough to build a business or have much in the way of time off. My current fee rates are: £800 per day if the work is required at less than 4 weeks notice, £672 per day if given at least 4 weeks of notice, and £512 per day for work paid for in advance under a retainer agreement covering at least 2 days per month for 3 months. Expenses are agreed and billed for at cost. These rates will be increased from 1st January 1997 for all new clients, and from 1st January, 1998 for existing clients with retainer arrangements. One pound sterling is usually worth just over 1.5 US dollars. This structure clearly penalizes those who want work done at short notice (except those using the retainer option), but such work is often the most disruptive and stressful (working evenings and weekends to meet deadlines is all but inevitable if the work is to get done in the shortest possible time, for example).

As for marketing, I want to do it some day. I would like a better picture of the kind of market I am in, and I hope to put some time in on this next year. So far, it is has been more a matter of luck, of opportunities apparently coming out of the blue, and getting the occasional referral. It is only now beginning to feel like a proper business, but maybe that's just me getting restless again.

How Can Academic Programs Better Prepare Statisticians for Careers in the Pharmaceutical Industry?

R. N. Tamura
R. P. Rathmacher
Lilly Research Laboratories
Lilly Corporate Center
Indianapolis, Indiana 46285

Casual inspection of the *AMSTAT News* indicates that a large number of jobs available for statisticians are in the pharmaceutical industry or in contract research organizations that serve the pharmaceutical industry. Many pharmaceutical companies (including our own) do not even advertise in the *AMSTAT News* which indicates that the job opportunities are even larger than suggested from the published ads. This implies that at any academic statistics department, there are a large number of potential pharmaceutical statisticians. What can be done to help prepare students for those jobs? Articles by DeMets, et al. (1994) and Hoerl, et al. (1993) give excellent overviews of the applied statistics environment and we do not rehash those comments. In this brief article, we suggest some ideas to help statisticians "hit the ground running" in the pharmaceuti-

cal industry. Improving the quality of statisticians in industry is in the best interests of both the industries themselves and for the universities.

At our company, job performance is judged by a person's abilities in the broad categories of 1) technical expertise, 2) oral and written communication, 3) leadership and influence, 4) innovation and creativity, 5) teamwork and interpersonal skills, and 6) self-management. Not coincidentally, identical or very similar categories are judged during a job candidate's interview. We feel that proper guidance from advisors and faculty can help students in improving technical expertise, communication, leadership, and teamwork. Of course, developing these areas is a lifetime of work but some simple mentoring in school can start the process earlier and also enhance a student's chance of getting a better job.

Technical Expertise

Undergraduate and graduate programs in statistics concentrate on developing technical expertise and we believe this should continue to be the primary emphasis of any program. In the pharmaceutical industry, statisticians need to have methodological expertise in experimental design, linear and nonlinear models, survival analysis, and categorical data analysis. Familiarity with a wide range of statistical software is helpful. Applications of Bayesian methods is increasing in drug development and we think this trend will continue.

In addition to their technical skills in statistics, most pharmaceutical statisticians need expertise in areas in which they consult. A familiarity with biological sciences, chemistry, pharmacology, or medicine can be valuable in consulting. Advisors of undergraduate majors in statistics should encourage their students to take classes in the sciences. Although we rarely see the combination, a graduate degree in statistics along with an M.B.A. in management would be advantageous for those individuals who are interested in managerial careers.

Work experience in a pharmaceutical company is a positive factor in hiring decisions; therefore, advisors should encourage students to apply for summer internships and work-study programs in the pharmaceutical industry. Interns learn a large amount of statistics and also gain understanding of the different roles statisticians play in the drug development process.

Oftentimes during a job interview, it is apparent that the candidate knows absolutely nothing about drug development, the pharmaceutical industry, or the statisticians who work at the company. This is inexcusable when such information is easy to obtain. Students should know about the various phases of drug development and the role of the FDA in drug approval. Selected readings from Peace et al. (1988) or from Swit and Yohn (1990) can give perspectives on drug development from both the pharmaceutical and regulatory perspective. An interesting exercise would be to combine such reading with an actual case study of a recent approval. As an example, the first drug approval for amyotrophic lateral sclerosis (ALS, Lou Gehrig's Disease) was granted for the compound, Riluzole, in 1995. A case study might consist of:

1. reading background literature about the disease process (Mitsumoto, 1994 is a good example for ALS).

2. viewing on tape the FDA advisory committee meeting for the compound of interest and discussing the meeting from a statistician perspective. Advisory committees consist of physicians, scientists, and statisticians independent of either the FDA or pharmaceutical companies. The committees make recommendations on drug approvals to the FDA. The meetings are a fascinating combination of science, politics, medicine, and showmanship. Call: Regulatory TV Video Services, FDC Reports Inc., 5500 Friendship Boulevard, Chevy Chase, Maryland

20815: phone: (301) 657-9830 for costs of tapes or live hook-ups.

3. reading the FDA Freedom of Information (FOI) documents on the drug to read about the basis of approval for a drug. Write to the Food and Drug Administration and request the Summary Basis of Approval for the particular drug of interest. Address: Freedom of Information Office, Room 12-A-16 (HFI-35), Food and Drug Administration, 5600 Fishers Lane, Rockville, Maryland 20857. Allow plenty of time to process the request.

Many pharmaceutical companies have home pages that describe their companies (e.g. Eli Lilly: `http://elvis.d50.lilly.com`). Students should read such information if they are interested in working at a pharmaceutical company. Very useful information about companies can also be obtained from financial references such as the ValueLine, and the Standard and Poors, which discuss these companies from an investor's point of view. Back issues of the Wall Street Journal and business magazines such as Forbes and Fortune also provide useful information about companies. Finally, the Current Index to Statistical Abstracts and the ASA Membership can be searched on line to gain information about statistical research being conducted by statisticians at a pharmaceutical company. Interviewing for a job is an important event and students should adequately prepare for interviews.

Communication

Many inexperienced statisticians struggle with both oral and written communication when entering the pharmaceutical industry. The difficulty is almost always in communication with non-statisticians. Consulting experience in academic environment provides a valuable training ground for communication skills; however, we notice that much of the consulting done within academic consulting laboratories is reactive (clients approach statistician after data has been collected) as opposed to proactive (statistician engages client early-on). In pharmaceutical companies, this is often combated by physically locating statisticians with their clients. A similar approach might might be useful in academic consulting laboratories for the more advanced students. Physically locating students with the researchers provides an environment to interact routinely with clients. This would allow student consultants to attend client seminars, give seminars to clients on topics of interest to clients, serve on client work groups, and involve themselves early in the design of studies. Most pharmaceutical statisticians indicate that the some of the most useful and satisfying consulting they do started from spontaneous and unplanned discussions with clients; we suspect the same would be true in the academic environment. Assigning more than one student to the client community would provide both overlap of support and also prevent a young statistician from becoming too isolated. Statistics faculty must still supervise the process; but need not be physically close to the students in their consulting offices.

In statistical consulting classes, students should give formal presentations of their work for a non-statistical audience. Such training is especially valuable for inexperienced consultants since it forces them to frame the assumptions, results and implications of the statistical design and analysis in non-technical terms. These types of presentations are usually much different from the departmental seminars which emphasize the uniqueness and/or intricacies of the methodology.

Technical writing is a difficult but crucial skill for all pharmaceutical statisticians and requires constant practice. It would be wise for students to begin the process early on. In consulting classes, students should be required to write up assignments in plain English without technical jargon. Courses such as Scientific Writing and Business English are useful for all students (not just for students for whom English is a second language). Students who

need help with spoken English should be encouraged to take courses that are designed to improve speech and diction.

Leadership, Teamwork and Interpersonal Skills

All consulting statisticians would agree that strong leadership, teamwork, and interpersonal skills are necessary in the pharmaceutical environment. It is less clear how such skills can be developed and many academic statisticians would probably argue that such skills are outside of their realm. We agree that these skills cannot be "taught" in the same sense that statistical theory can be taught; however, we feel that advisors and faculty can play an important role in encouraging development.

We applaud the recent Undergraduate Data Analysis Contest and feel that faculty of undergraduate statistics students should encourage their students to form teams and participate in such contests. Similarly, graduate faculty can encourage students to develop teams and participate in the ASA College Bowl. The emphasis here should be on learning how to work together as a team, putting up with other people's idiosyncrasies, and working to achieve a common goal. Faculty can help by recognizing such efforts from all teams whether they win a prize or not. It would be useful for such teams to put together a written diary of their experiences, what they learned, what worked or did not work, and give tips for future students. In this way, experience can be passed from one generation of students to the next.

Many of the larger programs in statistics have large and active student clubs in statistics. Faculty can help this along by encouraging all students to participate, not just those students who are born leaders. Graduate students should be active members of departmental committees; also, the students should also be organized enough to have delegates to the Graduate Student Association. Such organizations are good introductions into the bureaucracies of large organizations and also encourage graduate students to mingle with those outside of the department. Similarly, students can participate in community organizations and play leadership roles outside of the formal academic community.

We do not expect to see candidates with the statistical prowess of R. A. Fisher, the political savvy of Franklin Roosevelt and the interpersonal skills of Dale Carnegie. Quiet, hard-working, motivated students should realize that there is a place for them also. We do feel, however, that the best candidates for the pharmaceutical environment demonstrate a commitment to continually improve their skills in these areas. When better to start than while they are still in school?

References

DeMets, D. L., Anbar, D., Fairweather, W., Louis, T. A., and O'Neill, R. T. (1994), "Training the Next Generation of Biostatisticians," *The American Statistician*, 48, 280-284.

Swit, D. and Yohn, J. eds. (1990), *Getting Your Drug Approved — FDA's Own Guidelines*, Washington: Washington Business Information, Inc.

Hoerl, R. A., Hooper, J. H., Jacobs, P. J., and Lucas, J. M. (1993), "Skills for Industrial Statisticians to Survive and Prosper in the Emerging Quality Environment," *The American Statistician*, 47, 280-291.

Mitsumoto, H. (1994), "Classification and Clinical Features of Amyotrophic Lateral Sclerosis," *Amyotrophic Lateral Sclerosis: A Comprehensive Guide to Management*, eds: H. Mitsumoto and F. H. Norris, New York: Demos Publications.

Peace, Karl E. (1988), *Biopharmaceutical Statistics for Drug Development*, New York: Marcel Dekker.

Another Successful Joint Meeting

Marcia L. Gumpertz
Chair, Section on Statistical Consulting

Many thanks to the sponsors who provided door prizes for the Consulting Section Mixer at the Chicago ASA meetings. We were overwhelmed by their generosity. Wonderful prizes were donated by SAS Institute, Duxbury Press, John Wiley & Sons, Cleveland Clinic Foundation, Statistical Solutions Limited, NCSS Statistical Software, Edge Enterprises, Edward Arnold Publishers, and Minitab, Inc.

Notes from the Editor

A few reminders about our section and the Internet:

- Our home page on the Internet is `http://www.amstat.org/sections/consulting.html`. That page points to an electronic version of this newsletter. Alternatively, you can find *The Statistical Consultant* on our World Wide Web server at the URL: `http://www.stat.wisc.edu/statistics/consult/newsletter`.

- If you are not receiving your copy of *The Statistical Consultant* by mail, contact the people in the ASA membership department at `memdept@amstat.org`.

- The Section on Statistical Consulting has two listservers. The first is for discussing issues of interest to consulting statisticians. Topics include, but are not limited to: teaching statistical consulting; business aspects of consulting; consulting tips; consulting in different organizational settings; and information about statistical methods most used in consulting.

  To subscribe to the list send mail to: `majordomo@stat.lsu.edu` and in the body of the mail message (subject is ignored) put the command `subscribe asacnslt yournamehere <youremailaddresshere>`. If you have a signature or anything appended to the end of your mail, follow the above command with an "`end`" on the next line. After subscribing, you can send mail to the list by mailing to: `asacnslt@stat.lsu.edu`

  We also have a list that addresses issues of special interest to non-PhD and non-academic statisticians. To subscribe to that list, sending the message "`subscribe asacnslt-nonphd yournamehere`" (where "`yournamehere`" should be replaced by your own name) to the e-mail address `listserv@jse.stat.ncsu.edu`.

Your input please:

- Have your read a book or article or seen a video that would be of particular interest to our section members? I'd be happy to receive reviews of such items. For example, there might be a book out there on setting up a consulting business that you have found to be particularly useful. Or perhaps you've seen a video on interpersonal communication that you think is quite well done. If so, I'd like to hear from you.

- A colleague from another institution contacted me recently because the consulting unit that they work in is under threat of being closed, due to budget problems. They would be interested, and so would

I, in an article that would describe the importance and value of an in-house consulting program. They are at a university, and that particular focus would be useful, but a broader view relevant to industry would be just as helpful. If you have strong feelings on this topic and would like to share them, give me a shout.

As always, you can reach me via e-mail at:

clayton@stat.wisc.edu

and by US mail at:

Department of Statistics
University of Wisconsin—Madison
1210 W. Dayton St.
Madison, Wisconsin 53706-1685

THE STATISTICAL CONSULTANT
Murray K. Clayton, Editor
c/o American Statistical Association
1429 Duke St.
Alexandria, VA 22314-3402