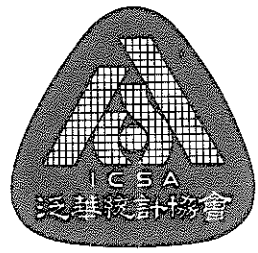
泛華統計協會會刊

International Chinese Statistical Association

Website: http://icsa.org

Bulletin

July 2000



編者的話：

會刊是我們會員的主要交流園地，預計每年在一月及七月發行兩期，希望各位踴躍賜稿，文章以一至二頁爲主，須用中文繁體字或英文書寫，文章性質以一般性非專門學術的文章爲主，以前或本期會刊內的各篇短文都是很好的範例，稿件如採用，我們希望能由作者安排打字，完稿的上，下，左，右邊(margin)至少要有四分之三英吋，頁碼離底邊二分之一英吋，打字打在 8" x 11" 的白紙上。爲統一起見，若以英文書寫，請用 Microsoft Word 打字，中文繁體字請用 Microsoft Word with Valupack Fareast feature 打字。稿件的截止日期是六月十五日及十二月十五日。截止日期後收到的將列爲下一期的稿件。

刊內付有本會的申請表(application form)，其中會員動態內的著作(publication)以一年內的新作品爲限。

從 1994 年度起本會酌收徵才廣告費一頁 U.S.$200 或半頁 U.S. $120。

對於以上的一些構想，如果您有任何建議，請與泛華協會執行長丁乃迺迪(地址見下)聯絡，以期這份刊物更爲完善。

2000 會刊通訊錄編輯人員

Website: http://www.icsa.org

I.C.S.A. c/o Naitee Ting, Ph.D.
198 Spicer Hill
Ledyard, CT 06339-1534
U.S.A.

EXECUTIVES AND MEMBERS OF THE COMMITTEES OF ICSA 2000

EXECUTIVES

President	Chien-Pai Han (2000)
Past President	Tar Timothy Chen (2000)
President-elect	Chao Agnes Hsiung (2000)
Executive director	Naitee Ting (1998-00)
Treasurer	Xiu Chen (1998-00)

BOARD OF DIRECTORS

I-Shou Chang (1999-01), Hung Chen (1998-00), Rongdean Chen (1999-01), Tar Timothy Chen (1998-00). Jianqing Fan (2000-02), Chien-Pai Han (1999-01), Agnes Hsiung (2000-02), H.-M. James Hung (1998-00), Ker-Chau Li (2000-02), Dennis K.-J. Lin (1998-00), Karl K. Lin (2000-02), Dan-Yu Lin (1999-01), sJen-Pei Liu (1998-00), Nancy C. H. Lo (1999-01), Jun Shao (2000-02), Mei-Cheng Wang (2000-02), Zhiling Ying (1999-01), Cun-Hui Zhang (1998-00), Frank Shen (2000-02, Biometrics Section Representative)

STANDING COMMITTEES

PROGRAM COMMITTEE

Ouhong Wang (chair 2000; member 2000-01), Hung-Ir Li (2000), Wei Shen (2000), Mei-Cheng Wang (1999-00)
Term of reference: to plan, coordinate and arrange the annual meeting, 2000.

FINANCE COMMITTEE

Xiu Chen (chair 1998-00), H.-M. James Hung (2000-02), Christina Show (1998-00)
Term of reference: to oversee the budget and financial situation of the Association.

NOMINATING AND ELECTION COMMITTEE

Nancy C. H. Lo (chair 2000; member 1999-00), Dennis K.-J. Lin (2000-01), Chao Agnes Hsiung (1999-00), Mei-Cheng Wang (2000-01)
Term of reference: to nominate the candidates for the President-elect and members of Board of Directors.

PUBLICATION COMMITTEE

Jun Shao (chair 2000; member 1998-00), James J. Chen (2000-02), Zhiliang Ying (1999-01), Sue-Jane Wang (Bulletin), Ker-Chau Li (Statistica Sinica), Naitee Ting (ex-officio)
Term of reference: to supervise the publication policy of the Association and make recommendations with respect to the editorial policy of various publications.

CURRENT COMMITTEES

MEMBERSHIP COMMITTEE

Tzu-Cheg Kao (Chair 2000, member 2000-02), James J. Chen (1999-01), Chong Gu (2000-02), Xuming He (1998-00), Zhaohai Li (2000-02), Xufeng Niu (2000-02), Joe Shih (1998-00), Jane-Ling Wang (1999-01), Hung Chen (1999-01, Taiwan), Yeh Lam (1999-01, Hong Kong), Bo-Cheng Wei (1999-01, China)
Term of reference: to recruit more new members and contact potential interested individuals and organizations.

FUNDRAISING COMMITTEE

Naitee Ting (chair 2000), Jianping Dong (2000-02), Kuang-Chao Chang (2000-02, Taiwan)
Term of reference: to consider fund raising drive through individuals and corporations

PUBLIC RELATIONS COMMITTEE

Yi Tsong (Chair 2000, member 2000-02), Naisyin Wang (2000-02), Shi-Yong Feng (China), Sik-Yum Lee (Hong Kong), Lung-An Li (Taiwan)
Term of reference: to contact news media and publicize ICSA activities, to serve as a liaison between ICSA and other professional organizations such as ASA, Biometric Society for joint activities.

AWARDS COMMITTEE

Jack C. Lee (Chair, 2000; member 1999-00), Lynn Kuo (2000-02), Ming Tan (2000-02), Wai-Yuan Tan (1999-00), Mark Yang (1999-01), Cun-Hui Zhang (1999-01)
Term of reference: to accept, evaluate, and recommend nominations for ICSA various awards.

PROFESSIONAL ACHIEVEMENT COMMITTEE

Yuan S. Chow (chair 2000; member 1999-01), I-Shou Chang (1999-00), James C. Fu (2000-02), Grace Yang (1999-00), Zhenhai Yang (2000-02, China)
Term of reference: to discuss ICSA Fellows and Chinese COPSS award.

COMMUNICATION COMMITTEE

Chung Chen (chair 2000; member 1999-01), Don Sun (web), Hubert Chen (listserv)
Term of reference: to evaluate the database and the use of internet.

CONFERENCE COMMITTEE

Wai-Keung Li (chair), Xiao-Li Meng, Howell Tong, Kai-Tai Fang, Fred Ho, Jianqing Fan
Term of reference: to arrange the 5th ICSA International Conference, 2001.

APPLIED STATISTICS SYMPOSIUM COMMITTEE

Jia-Yeong Tsay (co-chair), Zhiliang Ying (co-chair), Danny Chaing, Rongdean Chen, Irwin Ho, Irving Hwang, Frank Shen, Weichung Shih, Kao-Tai Tsai, Weiying Yuan
Term of reference: to organize the Applied Statistics Symposium, 2000.

BOOK AND JOURNAL DONATION COMMITTEE

Tar Timothy Chen (Chair)
Term of reference: to solicit book and journal donations and to arrange the delivery to universities or colleges in need.

EXECUTIVE DIRECTOR AND TREASURER SEARCH COMMITTEE

Chao Agnes Hsiung (Chair), Smiley W. Cheng, Shein-Chung Chow, Nancy C. H. Lo, Naitee Ting
Term of reference: to recommend candidates for Executive Director and Treasurer for 2001-03.

STRATEGIC COMMITTEE (all former presidents)

Tar Timothy Chen (chair 2000), Jeff C. F. Wu, Shein-Chung Chow, Kuang-Fu Cheng, Smiley Cheng, Chiao Yeh, Yuan S. Chow, Jack C Lee, Grace Yang, Jia-Yeong Tsay, James Fu, George Tiao
Term of reference: to plan long-term strategies for the Association.

BIOMETRICS SECTION (2000)

James J. Chen (chair), Alice Hsuan (past chair), Weichung Joe Shih (chair-elect), Colin Wu (secretary), H.-M. James Hung (treasurer), Frank Shen (ICSA Representative, 2000-02).

EXPRESS YOUR OPINION

Dear Colleagues,

The upcoming year 2001 applied symposium and the 5th international conference of 2001 are sponsored by the ICSA. We'd like to notify you ahead of time and encourage your involvement by contacting the chairs of the corresponding events or by sharing your research findings with the members. Your suggestions / comments are welcomed. More details inside .....

IN THIS ISSUE

GET TASTE OF FEB IN NEXT ISSUE

Special topic – Finance
Statistics' Delight/ 統計趣聞
Controversial statistical Issue – active controlled clinical trials .....

Get involved in the next issue by email your articles to the Editorial Board at WANGS@CDER.FDA.GOV

Editor's Page

The More The Better ?

I once chatted with people about a report that men have, on average, 2 billion more brain cells than women have. A young man rushed to comment, "So men are smarter than women." He simply meant, the more the better. A business lady countered, "I think women's brain cells function more effectively and efficiently." A doctor took a moment's breath and said, "Well, I wouldn't be surprised, because men need more brain cells to coordinate both their larger bodies and extra physical activities; who knows, quantity of brain cells may have nothing to do with intelligence." A statistician inquired, "Maybe we should define what makes up smartness, a priori."

In presidential balloting, definition also plays a key role. For instance, the elections in Taiwan earlier this year encountered such a situation. Although Chen Shui-bian won the election by a margin of 2.5% (he received 39.3% of the popular votes; James Soong, his nearest competitor, received 36.8%), he did not receive a majority of the votes. For President Chen and his new government, interpretation of these numbers was more than science and art, it was also reality and compromise. But what is the appropriate way of defining victory? Is it "The more the better?" This question will also prove its importance in the coming November U.S. presidential elections. Despite leading Gore by 14% six months ago, Bush heads by only 2% now. Can Gore turn the numbers around in the end as President Chen did? In this issue, sampling methods used in polls are summarized from the Gallup. An unprecedented phenomenon of Abandon/Secure, statistical method of forecasting the impacts on the undecided voters and prediction modeling are discussed.

Frequentist theory of hypothesis testing has been the norm of standard statistical practice in well-controlled clinical trials. While probability equations may be straightforward, scientific debates that impact the public are not. With Bayesian's spirit, debates over defining prior distributions scientifically could easily fall into dispute. Should Bayesian approach outweigh the need to protect conventional wisdom of experiment-wise false positive rate? Will higher prediction probability always translate into "the more the better?" In this issue, several insightful articles, pro or skeptical on Bayesian's view, contribute to this newly introduced column of Controversial Statistical Issue.

With members' contributions and continuing interest on our Bulletin, amusing articles in each issue become our veins of support. As always, the Editorial Board welcomes your submissions.

Sue-Jane Wang
Editor-in-chief

MESSAGE FROM THE PRESIDENT

Dear ICSA Members:

Since the founding of ICSA, our association has been growing steadily. This is reflected by the increasing number of members and their interest in participating in symposiums and conferences. To wit, over 200 members attended the 2000 Applied Statistics Symposium in Piscataway, New Jersey. Although most participants were from North America, many of them were from China, Hong Kong, Taiwan and some from Australia, Jordan and other countries. The symposium was a big success. Our sincere thanks go to the Applied Statistics Symposium Committee.

To continue the growth of our association, we must build bridges between ICSA and the statistics community, including industry, government and academia worldwide. Of course, the bridge builders are the members. With your hard work, you can make ICSA serve your organization. When you attend an ICSA symposium or conference, you are benefited by acquiring new knowledge and making new friends, which in turn benefit your organization. Further your bosses and colleagues will know more about ICSA and the bridge will be strengthened.

We need to recruit new members so that we have more bridge builders. The Membership Committee is currently compiling a master list of potential members, who will be invited later this year to join ICSA. You can also participate in the membership drive by asking your friends to join us if they are not members of ICSA or by putting them on the master list by sending their names to me or to any member of the Membership Committee.

The finance of our association is in excellent condition (please see the Treasurer's report). We are constantly trying to use the resources to better serve our members, as ICSA is your association. Any suggestion to enhance our service to you is highly appreciated. On the other hand we must strengthen and secure our future financial situation. The Board of Directors has passed a motion to create a committee to study the long range financial planning of our association. This committee will undoubtedly steer us toward financial success.

As you know, the term of our Executive Director, Dr. Naitee Ting, will end this December. A new Executive Director will be elected. I would like to take this opportunity to thank Dr. Ting for his outstanding service to ICSA. He has spent endless hours to help me and my predecessors to fulfill our duties as presidents. Thank you, Naitee.

Our next membership meeting will be on August 16 in Indianapolis at the Joint Statistical Meetings. I hope that you are planning to attend JSM, and that I will see you there.

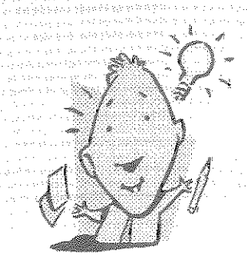
Chien-Pai Han,
President

Special Thanks from The Editorial Board

The Editorial Board would like to thank the following volunteers for their help during the preparation of this issue: Dr. Timothy Chen, Dr. Yi Tsong, Dr. H.M. James Hung, and Dr. Lianng Yuh.

If you have a new idea and are interested in joining us, please send your C.V. including your plan to the Editorial Board WANGS@CDER.FDA.GOV for consideration.

We encourage your active involvement in the ICSA Bulletin. Every effort counts.



Minutes from ICSA Membership Meeting on Saturday, June 2, 2000, 4:15-5:15 P.M. Embassy Suites, 121 Centennial Avenue, Piscataway, New Jersey.

Chair: Chien-Pai Han

Attendees: About 50 ICSA members

Minutes: Naitee Ting

1. Agree on the proposed agenda

   Agreed.

2. Agree on the minutes from the previous membership meeting (ICSA Bulletin, January 2000, pp. 4-6).

   Agreed.

3. Further discussion on issues from the previous meeting.

   No.

4. Report from the president.

Chien-Pai Han reported the following:

- Our association has been doing well. We continuously have successful Symposiums, and the International Conference is under good preparation now. Next year, the Conference will take place in Hong Kong. We hope all members can participate.
- Selected papers from the 1999 Applied Statistics Symposium will be published in two special issues of Communications in Statistics (Vol 29, Numbers 5 & 6, 2000). Organizing Editors are Chien-Pai Han and William W. S. Wei.
- ICSA will co-sponsor two programs with Caucus for Women in statistics – a reception and the child care program – in the 2000 ASA JSM at Indianapolis. Agnes, who represents ICSA, will also speak at the Caucus meeting.
- The good relationship between ICSA and ASA has been continued. We proposed members of committees for ASA and some of the recommended members have been appointed.
- The 1999 Applied Statistics Symposium was very successful. ICSA would like to recognize the effort from the Symposium committee by awarding a plaque to the committee and a certificate to each committee member. All of the committee members are being acknowledged:
  Tim Chen (Chair), James H.M. Hung, Chang S. Lao, Kung Yee Liang, Karl Lin, Zhaohai Li, Yi Tsong, William W.S. Wei, Colin Wu, and Henry Hsu.

In addition to the committee members, the following individuals have also made important contributions to the 1999 Symposium: Jiaquan Fan, Xuejun Chen, Binbing Yu, Gang Zheng, Jinyu Yuan and Chenxiong Le.

The 2000 Symposium Co-Chair Jia-Yeong Tsay then delivered the 2 student awards from this Symposium. Each of the two students received a check of $300. The student award was set up to encourage student participation of the symposium as well as to increase student membership. A formal announcement of the award was made in July, 1999 issue of the ICSA Bulletin and at the ICSA web site. The selection process was coordinated by Zhiliang Ying, who worked with Joe Shih, chair of the award committee.

The two recipients are

1. Mr. Tongwei Liu, Stanford University, paper title: Segmentation and Estimation in Noisy Signals with Occasional Parameter Changes. And
2. Dr. Chunming Zhang, University of North Carolina-Chapel Hill, paper title: Adaptive Tests of Regression Functions via Multi-Scale Generalized Likelihood Ratios

Finally, Jia-Yeong Tsay acknowledged the contributors to the 2000 Symposium: ACRO Contract Research, Agouron Pharmaceuticals, Inc. Astra Zeneca Inc. Bristol-Myers Squibb Co. DuPont Pharmaceuticals Co. IBAH, Inc., Jensen Research Foundation, MedImmune Oncology, Merck & Co, Inc., Pfizer Inc., Monsanto-Searle, SmithKline Beecham Pharmaceuticals, StatPlus, Inc., and two individuals Irving K. Hwang and T.Y. Lee.

5. Business report

5.1 Executive Director

The database conversion is in progress. VLP, the vendor that helps ICSA setting up the new database, is in the process of converting our database on to the new system. With in the next few months, the ICSA home page, as well as the new database, will be hosted by VLP. Once the database has been converted, there will still be a lot of manual work to adjust various fields into the right order.

The new system will allow each member a password. Once the new database is up and running, members may eventually be able to update his/her own records.

5.2 Treasurer

Refer to the treasurer report which is published on the July Bulletin.

5.3 Statistica Sinica

We hope members can continuously submit your best papers to Statistica Sinica.

5.4 ICSA Bulletin

The January Bulletin received many positive comments. Sue-Jane Wang, the Bulletin Editor, reported her vision of the Bulletin starting year 2000. With the effort from Sue-Jane and the Editorial Working Committee, there will be the following additions:

- Interesting statistical stories;
- Special topic (an example is the topic regarding the earth quake at Taiwan presented in the January issue);
- Controversial statistical topics.

Sue-Jane also hopes interested members to contact her, and join the Editorial Working Committee.

5.5 Committees

5.5.1 Program Committee (2000 JSM Banquet)

Dr. Ouhong Wang from Ely Lilly & Co. will be organizing the JSM banquet in August. This year the banquet will take place at a Thai restaurant not far from the JSM. The announcement of this activity can be found from the July issue of ICSA Bulletin.

5.5.2 Finance Committee

Refer to the treasurer report which is published on the July Bulletin.

5.5.3 Nominating and Election Committee

There are two candidates for the 2001 President-Elect, 10 candidates for the 2001-2003 ICSA Board. For Biometrics Section members, there will be 3 candidates for the 2001 Chair-Elect. Ballots will be sent out in early June. Please vote.

5.5.4 Publications Committee

As indicated previously, selected papers from the 1999 Applied Statistics Symposium will be published in the Communications in Statistics. The publications committee is coordinating with the 2001 Symposium committee to see if papers from 2001 Symposium will be published as a special issue. There may be a formal report from the publications committee in the next membership meeting during the Indianapolis JSM.

5.5.5 Membership Committee

Membership committee is looking into various ways of recruiting potential members. If there are any proposals or suggestions, please contact Tzu-Cheg Kao, the Committee Chair.

5.5.6 Awards Committee

Two Distinguished Service Awards will be presented during the next membership meeting at Indianapolis.

5.5.7 Applied Statistics Symposium Committee

Jia-Yeong Tsay, the Co-Chair of the 2000 Symposium Committee thanked all of the committee members who spent a lot of effort to make the 2000 Symposium a big success. He also hopes the 2001 Symposium can be another success.

5.6 ICSA 5th International Conference

The 5th International Conference will take place in August 17-19, 2001, at Hong Kong. The meeting time is before the ISI conference of Souel. We anticipate many members to participate. There will be two keynote speakers – T.L. Lai and Peter Hall.

5.7 2001 Applied statistics Symposium

The ICSA 2001 Symposium will take place in Chicago at the Congress Hotel. Dates will be June 8 to 10 of 2001. We hope members will make an effort to participate.

6. Other items

No other discussions.

Useful Statistical Society Web Links

http://www.amstat.org	American Statistical Association
http://www.icsa.org	International Chinese Statistical Association
http://wwwmaths.anu.edu.au	The Institute of Mathematical Statistics
http://stat.tamu.edu/cis	Communications in Statistics
http://www.stat.unipg.it/iasc.htm	International Association for Statistical Computing
http://www.rss.org.uk	The Royal Statistical Society
http://www.enar.org	Biometric Society, ENAR

Report on the ICSA 2000 Applied Statistics Symposium

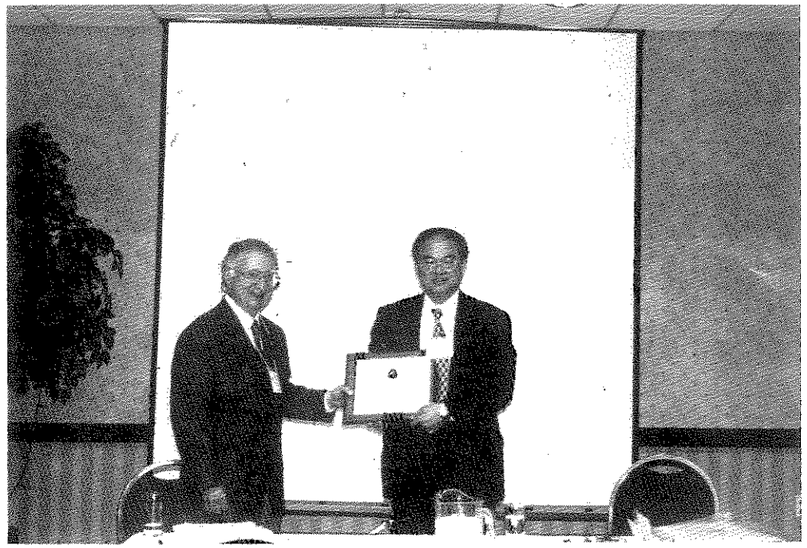
by Jia-Yeong Tsay

To celebrate the 10th anniversary of the ICSA Applied Statistics Symposium in the new millennium, the Board of Directors appointed Jia-Yeong Tsay as the symposium chair for the ICSA 2000 Applied Statistics Symposium during the August 1998 Board Meeting. In late 1998, he invited a group of highly experienced and dedicated individuals to form the Symposium Program Committee. The committee members were Danny Chaing, Rongdean Chen, Irwin Ho, Irving Hwang, Frank Shen , Weichung Joe Shih, Kao-Tai Tsai, Zhiliang Ying (Co-Chair), Weiying Yuan, Jun Zhao, in addition to, Jia-Yeong Tsay himself. A monthly Committee Meeting had been held since January 1999 until the time of the Symposium.

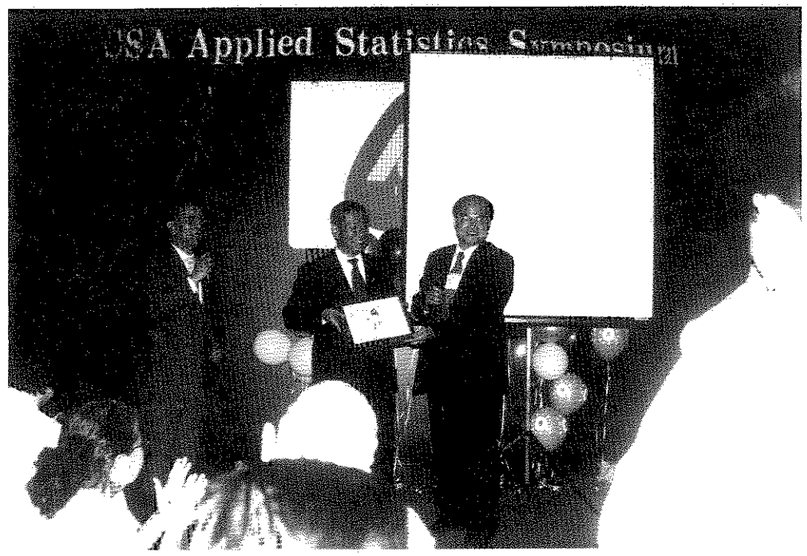
The Symposium was held at the Embassy Suites Hotel in Piscataway, New Jersey from June 1 to June 3, 2000. The first day was for the short courses, which included *ICH E10 Guideline and Design Issues in Non-Inferiority/Equivalence Trials* by Dr. Irving Hwang; *Experiments: Planning, Analysis, and Parameter Design Optimization* by Professor Jeff Wu; and *Statistical Designs for Genetic Epidemiology* by Professors Terri Beaty and Kung-Yee Liang. The second and third days were for the invited and contributed sessions with a total of 25 sessions presented. The topics ranged from various types of statistical issues at the FDA, statistical applications in finance, clinical trials, and information science, to SAS programming, career mentoring and development, etc. Speakers included experts of underlying areas from FDA, NIH, academia, and various industries. Professor Marvin Zelen of Harvard University delivered an interesting and inspirational keynote speech on the topic of *Statisticians, Statistical Science, and the Future*. The banquet on June 2 was highlighted with a special speech on *Advances in Forensic Sciences*, given by Dr. Henry Lee, Commissioner of Public Safety, State of Connecticut.

The Symposium had a big turnout. A total of 221 professional colleagues attended the Symposium from many different countries. In addition to the majority of US attendees, foreign attendees included colleagues and friends from Canada, Australia, Jordan, Mainland China, Taiwan, Hong Kong, and so on. Contributing factors for the success of the Symposium include having a cohesive Program Committee to develop an attractive program, outstanding speakers to make interesting presentations, numerous helpers to support local logistic, among other things. Special thanks go to those volunteers, particularly, (a). Volunteers at the banquet: Aiyang Tao, Yamei Wang, Li Li, Dixi Xue, Xujie Yu, Henry Wu, Ting-chuan Wang, Huei-chung Dang , Joe and Jeannie Shui; (b). Students from Rutgers University for meeting site services: Yaning Yang, Jianshan Zhang, Hong Yin, Jyhming Shoung, Xin Tian, Jun Liu, Hongwei Wang.

In sum, the ICSA 2000 Applied Statistics Symposium was very successful. On behalf of the ICSA, I would like to thank all participants for their contribution to the success of the Symposium.



Keynote speaker, Professor Marvin Zelen of Harvard University (above), and banquet speaker, Dr. Henry Lee, Commissioner of Public Safety, State of Connecticut (below center) with banquet chair, Irwin Ho on the left, receiving certificates of appreciation from symposium chair, Dr. Jia-Yeong Tsay.



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ICSA Founding President, Professor George Tiao (first left of balloon), chatting at the banquet (above). Banquet with karaoke became part of ICSA's organizational culture. Performing among others: Dr. Irving Hwang (below right); Danny Chaing (below left).

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ICSA President, Professor Chien-Pai Han, chairing the general membership meeting (above). In the audience (below first row from left): Drs: Gang Li, Peter Shao, Jane Wu, Alice Hsuan, Francis Hsuan, among others.

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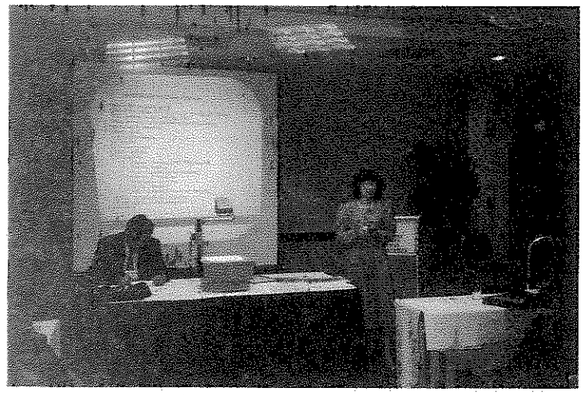

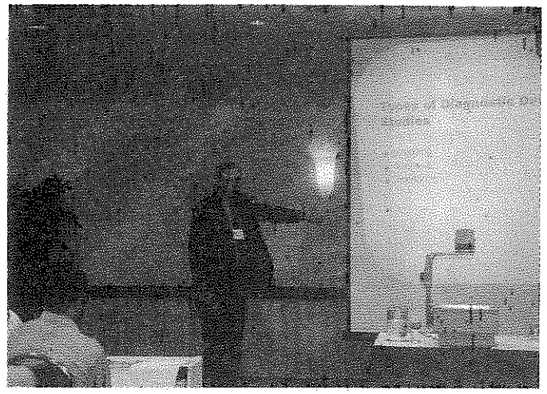

Making presentation among participants: Dr. Sue-Jane Wang (above left), Chief Editor of ICSA Bulletin; Dr. Greg Campbell (above right), President of FDA Statistical Association; Professor Gary Koch (below left) of UNC; Dr. Frank Shen (below right) of Bristol-Myers Squibb Co.

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Student Award Winners

By Zhiliang Ying

The student award was set up to encourage student participation of the symposium as well as to increase student membership. A formal announcement of the award was made in July, 1999 issue of the ICSA Bulletin and at the ICSA web site. The selection process was coordinated by Zhiliang Ying, who was to receive all submissions and transfer anonymous (for purpose of blinding) manuscripts to Joe Shih, chair of the award committee.

There were a total of three submissions. Among them one withdrew later due to an authorship complication. The remaining two blinded manuscripts were sent to Joe Shih. The initial evaluation showed that the two papers are of outstanding quality. Because of this and the lack of competition, Joe Shih and the organizing committee felt it to be unnecessary to have a formal review committee and approved to award both submissions.

The information for the two recipients are

Mr. Tongwei Liu, Stanford University
Paper title: Segmentation and Estimation in Noisy Signals with Occasional Parameter Changes.
Biosketch: Tongwei Liu is a Ph.D. candidate at the statistics department, Stanford University. He graduated from Peking University, China in 1995 with a B.S. in mathematics. His research interests include time series analysis, change-point problems, MCMC simulation.

Ms. Chunming Zhang, University of North Carolina-Chapel Hill
Paper title: Adaptive Tests of Regression Functions via Multi-Scale Generalized Likelihood Ratios.
Biosketch: Chunming Zhang received B.S. (1990) in mathematical statistics from Nankai University. After obtaining M.S. (1993) in Computational Mathematics from Academia Sinica, she had been Research Assistant Prof. there for two years before she was a graduate student in Department of Statistics, University of North Carolina-Chapel Hill. She received her Ph.D. in May 2000 and will be Assistant Professor at University of Wisconsin-Madison starting August 2000. Her research interests include : nonparametric function estimation and hypothesis testing, asymptotic theory, statistical methods in finance, simulation technique, and algorithm analysis.

Report from the Editors of Statistica Sinica

Ker-Chau Li and Yi-Ching Yao

Nearly one year has passed since we took over the editorial office last year. Between July 26, 1999 and July 15, 2000, we have received 161 new submissions. This rate is about the same as in the past - 158(1997), 157(1998).

Our office has tried to set a standard of 4 months for the first round review times. So far, 68 submissions (42%) were handled within this standard time, 23 (14%) were late by one month, 12 (7.5%) were late by two months, 1 was late by 3 months. There are 55 (34%) submissions for which the first review is not complete yet. Among them, 1 submission is 3 months overdue, 3 are two months overdue, 6 are one month overdue. Compared to other journals the shortness of our tail distribution (for example, the quartiles for Annual of Statistics are 44, 160, 262 days) is already remarkable. Apparently, this cannot happen without the greatest efforts from our Editorial Board and many anonymous referees they have contacted. Their invaluable contribution is very much appreciated.

Among the 106 submissions for which the initial decision was already made, 70 (66%) were rejected, 3 were accepted, others were either tentatively accepted or rejected. The backlog is getting slightly better now. The papers accepted by July 15, 2000 shall appear in January 2001. Statistica Sinica continues to improve its paper quality and area diversity.

Report on ICSA E-Communications

By Hubert Chen

May 12, 2000

The ICSA e-mail communication services has been modified and changed to the new address icsalst@listserv.uga.edu since May 2000. The manager of the listserv is Professor Hubert J Chen at the Department of Statistics. The University of Georgia is managing the e-list. You may request to add or to delete your e-address from the listserv by informing him at chen@stat.uga.edu. Currently, both Dr. Hubert Chen and Dr. Naitee Ting can help you put your icsa-related messages on the e-communication services.

The ICSA listserv has not been working since March this year due to some unknown factor. Our support staff will help fix it during the summer.

PAO-LU HSU (XU BAOLU 許寶騄), PIONEER CHINESE STATISTICIAN

T. Timothy Chen, the University of Maryland School of Medicine

Note: After attending the 1998 ICSA Fourth International Statistics Conference in Kunming, I visited Beijing. At Beijing Friendship Hotel on August 30, I had the chance to meet with Professors Yao-ting Zhang (張堯庭) and Ping Cheng (成平) and talk about their esteemed teacher – Professor Pao-Lu Hsu.

UNDER OLD CHINA

Professor Hsu was born on September 1, 1910 in Beijing. He first entered Yenching University to study chemistry in 1928. A year later he entered Tsing-hua University to study mathematics and obtained his B.S. degree in 1932. From 1934 he was an instructor at Peking University for two years. He passed the Chinese government examination two times (the first time he did not go due to his health problem) and obtained support through remitted Boxer indemnities (庚子賠款) to study at University College, London in 1936. His research was supervised by Egon S. Pearson, and received his Ph.D. degree in 1938, and a D.Sc. degree in 1939. He then spent a year in Paris with Hadamard. Professor Jerzy Neyman, his teacher, said that Hsu was his most outstanding student (C. Read, Neyman—from life, 1982, Springer-Verlag, New York).

In 1940, after the French capitulation, and before Hitler's impending invasion of England, Hsu returned to China, his war-torn homeland, and taught at Peking University (now part of Southwestern Associated University 西南聯大) from 1940 to 1945. Feeling the suffering of the masses during this period, he joined a political organization—China Democratic Revolutionary Group (中國民主革命同盟), which was controlled by Chinese Communist Party central bureau. Through Neyman's invitation he came to the U.S. to attend the first Berkeley Symposium on Probability and Statistics after the war in Europe was ended in August of 1945.

After the Berkeley Symposium, from 1945 to 1947 Hsu taught one semester at the University of California, Berkeley and one semester at Columbia University. Then he taught one year at the University of North Carolina as an associate professor at the new statistics department created by Hotelling. Since the field of statistics was expanding and there was a shortage of established scholars like Hsu, he rendered very important services in these three universities. He was elected a fellow of Institute of Mathematical Statistics in 1946. In spite of many efforts to keep him in the U.S., Hsu returned to Peking University in 1947 (C. Reid, Neyman—from life). He welcomed the Communist liberation in 1949, and cabled his American colleagues to express his joy over the new day for China.

His research up to this point was about inference in univariate and multivariate linear models and related distribution theory, both exact and asymptotic. According to Professor E. L. Lehmann, "Hsu wrote a remarkable series of papers

on statistical inference which show the strong influence of the Neyman-Pearson point of view." (The Annals of Statistics, 7 (3): 471-473, 1979) Professor Anderson commented, "Hsu published papers in the forefront of the development of the mathematical theory of multivariate analysis. It can be assumed that he was influenced by his proximity to R. A. Fisher, who was also at University College, London." (The Annals of Statistics, 7(3): 474-478, 1979).

UNDER NEW CHINA

From 1948 to 1955, Hsu conducted his research in mathematics, especially in algebra, and mathematical logic. Because the probability and statistics were not deemed important by the government, he worked on matrix theory and published several papers in Chinese mathematical journals. These publications were also related to the method of characteristic function. He also studied Russian and translated several important Russian mathematics texts into Chinese.

Professor K. L. Chung (鍾開萊 emeritus, Stanford University) was originally a student under Lo-Gen Hwa (華羅庚), but he switched to study under Hsu at Southwestern Associated University. Regarding Hsu's work in characteristic function, Chung commented, "Hsu's method is direct and starts from nothing. He had always considered the minimal reliance on precedents as a virtue of mathematical work, and it is apparent in all his papers where use of previous results for intermediate steps are shunned so far as possible." (The Annals of Statistics, 7(3): 479-483, 1979).

In 1954, Chinese science delegates went to visit USSR, and Professor Kolmogorov inquired about Hsu. People began to realize Hsu's international status. In 1955, he was appointed a member of China National Political Committee (中國政協委員). During the same year, he was elected as a member of Chinese Academy of Sciences together with other famous mathematicians like Lo-Gen Hwa, and Bu-Chin Su (蘇步青).

HIS WORK OF TRAINING STATISTICIANS

In 1956, Premier En-lai Zhou chaired a national science development planning and designated three important areas in mathematical sciences—partial differential equation, computational mathematics, and probability and statistics. The training of probabilitists and statisticians took place at Peking University under the direction of Hsu and Professor Tseng-tong Cheng, a student of William Feller. About 50 students from all over China gathered at Peking University. Hsu began to chair the first probability and statistics research group at Peking University.

From 1956 to 1959, under his leadership, Invariance Principle (Prokhorov, Donsker), Multivariate Analysis (Anderson), and Stochastic Process (Doob) were the subjects of the seminar and investigation. He asked his students to take turn to lead the seminar. After they finished, he then summarized the whole seminar in his particular succinct way. From 1959 to 1962, Experimental Design and Sampling Survey (Cochran) were the subjects. Under his leadership, a survey of forest in China was carried out during that period. From 1963 to 1966, the subjects were Order Statistics, Stationary Time Series (Grenander and Rosenblatt), Markov Processes, and Combinatorial Mathematics. The reason that he had to change the direction in 1963 to more theoretical subjects was the interference of politics.

When Cultural Revolution broke out in May of 1966, all teaching activities ceased, and he together with other faculty members in the university suffered. He died on December 18, 1970, due to worsening of chronic tuberculosis. At his bedside, friends collected his working papers and a Parker fountain pen. He contracted tuberculosis in 1933, and stayed single all his life. He was about 174 centimeter high, and weighed about 43.2 kilograms. He was physically weak since 1955. During that year, he was not able to finish his lectures in a course on probability theory due to his physical condition. During later years, he had to sit on a sofa at his home to give lectures in the research group seminars.

HIS LEGACY

The legacy of Hsu according to his associate Yao-ting Zhang was his perseverance in scientific research and his care of his students. He was very careful in his reading of famous textbooks. He did all the exercises in the books and always found the errors in the text or made improvements in the derivation. Hsu classified mathematicians into three classes. Kolmogorov, John von Neumann, and Norbert Wiener belonged to the first class of genius because they created new fields. The second class consisted of people like Khintchine (statistical mechanics) who synthesized the existing field and made many breakthroughs. In the third class were those who worked on important problems, but not the work of synthesis. He considered himself not highly gifted, but through hard work had made some contributions to the advancement of statistical theory. (Zhang, Journal of Qufu Normal University, 曲阜師範大學學報, 17: 104-112, 1991). Through his influence, the Statistics Laboratory was established in 1983, the Department of Probability and Statistics was founded in 1984 in Peking University. The Chinese Journal of Applied Probability and Statistics was published in 1985 through Chinese Probability and Statistics Association.

Hsu was indeed the pioneer Chinese statistician who blazed the trail. He was recognized as the first Chinese mathematician with international status in the fields of mathematical statistics and probability (Pao-Lu Hsu Collected Papers, 1983, Springer-Verlag, New York). In Neyman's opinion, Hsu was absolutely on a level with Abraham Wald—they were two outstanding mathematical statisticians in the following generation (C. Reid, Neyman—from life). Wald died in an airplane crash while on a lecture tour of India in 1950 at the age of 48; Hsu died at the age of 60. It was a sad story that Hsu did not publish more outstanding papers after 1950, but he certainly had laid a very solid foundation for the development of statistics in China. Right now China is putting much emphasis on the development of science and technology; Hsu must be smiling in his grave and regrets that springtime comes 50 years late.

Historical note: Professor Hsu was one of the first three Chinese students went to University College London to study statistics under ES Pearson through the remitted Boxer indemnities. Another student, Dr. Pei-Ching Tang (唐培經) studied there from 1934 to 1937 and worked on the non-central F-distribution for the power function of the analysis of variance tests. Tang returned to China and taught at universities from 1937 to 1949. He visited Iowa State University 1947-8, 1951-2, then worked at UN Food and Agriculture Organization from 1952 till his retirement in 1968. Tang was elected a fellow of American Statistical Association in 1952, the first Chinese-American received this honor.

The members of Probability and Statistics study group in 1959 (top left), The members of Probability and Statistics study group in 1960 (bottom), The members of Probability and Statistics study group in 1963. In this picture, Professor Kai-tai Fang (方開泰) was the second person from the left standing on the second row (top right).

SPECIAL TOPIC

[1]Presidential Survey Polls in US

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The process of polling is often puzzling, particularly to those who don't see how the views of 1,000 people can represent those of hundreds of millions. Interesting questions arisen, for instances, includes

How survey poll results could differ so much from personal impressions of what people think,
How survey polls go about selecting people for inclusion, and
Why 'we' have never been interviewed, etc.

The value of public opinion polls in a democracy lies in the public, the very people whose views are represented by the polls, having confidence in the results. This confidence does not come easily.

How polls are conducted in US

Among survey poll organizations in the United States, the Gallup Poll Organization has been around for a long time and has been known to have a fairly complete system with a track record. I have chosen "The Gallup Poll Organization" as a model to illustrate the process generally carried out by polling agencies in the United States.

Selecting a Random Sample – Basic principle of a valid survey is equal probability of selection.

First, clearly identify and describe the population that a given poll is attempting to represent. Next, choose or design a method, which will enable sampling target population randomly.

When The Gallup organization conducts a national opinion poll, they select a place where all or most Americans are equally likely to be found, i.e., in their home.

The Number Of Interviews Or Sample Size Required – The typical sample size for a Gallup poll which is designed to represent this general population is 1,000 national adults. The laws of probability say that if we were to conduct the same survey 100 times, e.g., asking people in each survey to rate the job Bill Clinton is doing as president, in 95 out of those 100 polls, we would find his rating to be between 47% and 53% assuming no favoritism is imposed. In only five of those surveys would we expect his rating to be higher or lower than that due to chance error.

The Interview Itself – The standard method of interview was conducted in-person, which last for early fifty years, from about 1935 to the mid 1980s, and it was a demonstrably reliable method with the average error in Gallup's final estimate of the election being less than 3 percentage points. By the end of the 1980s the vast majority of Gallup's national surveys

[1] The views expressed in the article are those of the author and not necessarily of FDA. Most of the information in the article is directly from the publications and websites listed in the section of references.

were being conducted by phone. Once the computer has selected a phone number for inclusion into a sample, Gallup goes to extensive lengths to try to make contact with an adult American living in that household with a recall system of a few hours later, then again on subsequent nights of the survey period to correct for possible bias of non-responders. The within household selection process is built in to assure that an individual within that household is selected randomly. These procedures help ensure that every adult American has an equal probability of falling into the sample.

The Questions – Gallup's rule is to ask the question in a way, which mimics the voting experience as much as possible. Through the years, Gallup has often used a split sample technique to measure the impact of different question wordings. A randomly selected half of a given survey is administered one wording of a question, while the other half is administered the other wording. This allows Gallup to compare the impact of differences in wordings of questions, and often to report out the results of both wordings, allowing those who are looking at the results of the poll to see the impact of nuances in ways of addressing key issues.

Conducting the Interview – Most Gallup interviews are conducted by telephone from Gallup's regional interviewing centers around the country. Trained interviewers use computer assisted telephone interviewing (CATI) technology, which brings the survey questions up on a computer monitor and allows questionnaires to be tailored to the specific responses given by the individual being interviewed. The interviews are tabulated continuously and automatically by the computers. In most polls, once interviewing has been completed, the data are carefully checked and weighted before analysis begins. The weighting process is a statistical procedure by which the sample is checked against known population parameters to correct for possible sampling biases on the basis of demographic variables such as age, gender, race, education, or region of country.

Once the data have been weighted, the results are tabulated by computer programs, which not only show how the total sample responded to each question, but also break out the sample by relevant variables.

Interpreting the Results – The results to all Gallup surveys are in the "public domain" - once they have been publicly released by Gallup; anyone who chooses may pick up the information and write about it themselves. The survey results are regularly published in the major media, in the *Gallup Poll Monthly*, and on several electronic information services such as Nexus, the Roper Center and the Internet. Gallup also makes the raw data available to researchers who want to perform more complex statistical analysis.

Presidential election result between 1936 and 1996

About 95 millions (47.5% of adult) Americans voted in the 1996 Presidential election. The National Council on Public Polls averaged pre-election polls of nine survey organizations as the final poll estimated and compared this result to that of the actual presidential vote: 47,401,054 or 50.1% of Americans voted for Bill Clinton. The sample estimate was roughly 2% points of the actual result.

To gain a better sense of the contrast between the pre-election poll and the actual election, the Gallup News Service has summarized the results and accuracy of presidential survey poll in US between 1936 and 1996, as shown in the Table below. When compared to the actual election outcomes, it was found that the average poll error for presidential election between 1956 and 1996 has been declining, with an average poll error on each candidate of 1.9% points. Result in 1992 was an exception because there is no historical precedent for Perot, an independent candidate who was accorded equal status to the major party nominees in the presidential debates and had a record advertising budget.

Gallup Poll Accuracy Record of Presidential Survey Polls in US†

Year	Gallup Final Survey		Election Results		Deviation
1996	52.0%	CLINTON	50.1%	CLINTON	+1.9%
1992*	49.0	CLINTON	43.2	CLINTON	+5.8
1988	56.0	BUSH	53.9	BUSH	-2.1
1984	59.0	REAGAN	59.1	REAGAN	-0.1
1980	47.0	REAGAN	50.8	REAGAN	-3.8
1976	48.0	CARTER	50.0	CARTER	-2.0
1972	62.0	NIXON	61.8	NIXON	+0.2
1968	43.0	NIXON	43.5	NIXON	-0.5
1964	64.0	JOHNSON	61.3	JOHNSON	+2.7
1960	51.0	KENNEDY	50.1	KENNEDY	+0.9
1956	59.5	EISENHOWER	57.8	EISENHOWER	+1.7
1952	51.0	EISENHOWER	55.4	EISENHOWER	-4.4
1948	44.5	TRUMAN	49.9	TRUMAN	-5.4
1944	51.5	ROOSEVELT	53.3	ROOSEVELT	-1.8
1940	52.0	ROOSEVELT	55.0	ROOSEVELT	-3.0
1936	55.7	ROOSEVELT	62.5	ROOSEVELT	-6.8

† source: http://www.gallup.com

Criticism of survey polls – How appropriate are they?

More recently, criticisms of polls were summarized in an October, 1999 *Reader's Digest* article by Eric Burns: "Is Democracy Just a Numbers Game?" with the subtitle "By Choosing Polls over Principles, our Politicians Are Failing the Test of Leadership." At one point, Burns states that polls "are democracy's antithesis." Although the article is short, it summarizes some of the more prevalent polling critiques. For that reason, the piece provides us the opportunity to present again the very positive story of polling and its value to society. In the sections, which follow, we can look at Burns' specific criticisms one by one in contrast with general perception.

"Polls are sometimes wrong." – Overall, however, across all of the elections in which pre-election polls are conducted, the general consensus is that polls in fact do very well - that is, polls based on small samples accurately reflect the opinions and in the case of voting, behavior of the millions they represent.

"Poll questions can be phrased to make the answers pointless, irrelevant, or deceptive." – The validity and value of polling - just as is the case for the validity and value of journalism and science - is highly dependent on the people doing the polling and the way in which the polling is done. Professional pollsters abide by the rules of the American Associate of Public Opinion Polling which requires that the full and exact wording of each question used in a publicly-released survey be made public.

"Polls do not provide a fair sampling of the American public, only a fair sampling of people willing to answer pollsters' questions." – All polling is based on the assumption that a small number of elements can represent a larger population from which they were derived. That is the very nature of sampling. Burns' assertion is that the various ways in which smaller and smaller groups of people are selected from the larger population is "unfair". But, this is in fact the precise issue on which social scientists, statisticians, and pollsters have focused their attention for the over 60 years. Available evidence consistently

shows that this is not a major biasing factor, but it is an issue which pollsters are constantly evaluating.

"Because polls are now taken in the immediate aftermath of events, they record public opinion at the precise moment when it is forming, at its most fluid, before people have had time to reflect and gain perspective." – Burns' assertion reflects only part of the usual process. Indeed, the analysis of the trend in public opinion as time marches on is one of the most valuable contributions of polling.

"There are so many polls today that one cannot help but call the results of another into question." – When different polls conducted by different organizations agree, as is most often the case, conclusions about public opinion are solidified and there is more scientific assurance that the results are valid than if there were just one poll.

"Polls can also lead to journalistic irresponsibility." – According to Editor-in-Chief of The Gallup Poll, journalists are more likely to do their job irresponsibly when they *ignore* the voice of the people - as represented scientifically through polls - than when they take polling data into account.

Summary

This close relationship between the poll results and actual vote is all the more impressive because of the unusual complexities involved in election polling. Unlike the statistical tests that occur in textbooks, the population and the sample in pre-election polls are not measured at exactly the same time. This presents an extra challenge to pollsters who are trying to relate what people in a sample say to what people actually do at a later point in time.

The key concept to bear in mind when analyzing poll data is that public opinion on a given topic cannot be understood by using only a single poll question asked a single time. It is necessary to measure opinion along several different dimensions, to review attitudes based on a variety of different wordings, to verify findings on the basis of multiple askings, and to pay attention to changes in opinion over time.

Update for the 2000 presidential election

Gallup's current likely voter estimation for 2000 assumes that 60% of the voting age population (VAP) will turn out to vote. (In 1996, turnout among the VAP was 49%. The average turnout rate in all presidential elections since 1980 is approximately 52%) - as of July 14-16, 2000.

Reference

Website of "The Gallup News Service" http://www.gallup.com.

[1] "How Polls are conducted", by Frank Newport, Lydia Saad, and David Moore, in "Your Frequently Asked Questions Answered" of the Gallup organization, 2000.

[2] "Gallup Poll Accuracy Record", by Gallup News Service, 2000.

[3] Where America Stands, 1997 John Wiley & Sons, Inc.

[4] "Is democracy just a numbers game? By choosing polls over principles, our politicians are failing the test of leadership", by Eric Burns, Readers' Digest, 1999

[5] "From the Editor", by Frank Newport, the Gallup Poll, 2000.

台灣大選民調

謝邦昌

輔仁大學統計系教授兼系主任

被扭曲與壓迫的民意

根據民國八十四年十一月七日報載『哈里士國際調查臺灣分公司的一項調查報告指出，在十月底全臺灣民眾當中很相信及有點相信民意調查結果者占39.9%；不太相信及很不太相信者占20.1%；另外有17.1%的人是有點相信又有點不相信；22.9%的人無意見或拒答』。對民意調查表示不相信的原因不外乎：受訪者回答不真實、調查單位不中立、問卷設計不客觀、調查動機有問題等，這些問題往往從報上的民意調查報導也看不出所以然，所以民眾是可以有很多理由來懷疑這些民意調查結果是否值得相信。但民調是否就真的不可相信呢?近來從事一些民意調查的工作，也因此有機會將民意調查上容易遇到的問題與經驗彙整，希望藉由這次的機會與大家分享民意調查中統計分析的一些問題。

在1997年縣市長選舉結束，國民黨有些黨員對「李連」做了一次聲望調查，結果其聲望爲歷年最低，發表後即遭到國民黨核心成員的強力指責。由此看來，民意調查是否會淪爲泛政治性的工具，調查工作者實在需要相當的道德勇氣。在調查結果報告出爐後，這個結果並不代表調查工作結束了，對於整個調查的問卷設計、抽樣方法、母體推估、執行與管理階層等等，都需要在調查後予以檢討、改進，因爲理論與實務之間是存在差距的，唯有不斷的檢討改進才有更準確、客觀的調查結果。

1997年的鄉鎮市長暨議員選舉中，各候選人或政黨所委託的民意調查結果差異頗大。以中和市爲例：選舉前各候選人引用不同的調查結果，並宣稱對方出局。如：選舉前兩天TVBS民調結果，呂芳煙領先鍾小平三個百分點，領先黃政瑞十五個百分點，而蓋洛普在選舉前一星期所做出的結果，表態的57.1%受訪民眾中，支持呂芳煙有18.1%，支持鍾小平有25.7%，支持黃政瑞有13.3%。然而，最後投票結果，在46%的投票率下，呂芳煙獲49.3%，鍾小平獲24%，黃政瑞獲26.6%。

爲防止候選人利用民調影響選舉，「總統副總統選舉罷免法」明定：「政黨及任何人或法人代表，不得於投票日前十日內，發布有關候選人或選舉之民意資料。」可是類似的規定並沒有出現在其他選舉適用的選罷法，以致應該中立客觀的民調，反成了選舉攻訐的工具。國內民調應學習民意機構最發達的美國，信用即是生命，莫再玩文字遊戲，而應重視文字本身的內涵及其所賴以發揮的統計分析結果。

若以民意長期受到扭曲與壓抑爲由，而視民意調查均不可信，則本質上否定了今日賴以做調查研究之母體族群（POPULATION），如此往後所謂的『民意調查』皆不可信，凡是民意調查則必爲非。孰不知，之所以要作民意調查，即是不知道何謂『真相』，才要花大筆人力、物力做問卷調查，我們要知道任何問卷調查的結果，並非母體族群之結果，即使再精密之問卷調查對行政機關或決策者而言都僅是『參考』資料而已，

採用與否之『行政責任』，所謂『天下有罪，罪在朕躬』，亦不能因其所『參考』之問卷調查結果錯誤而推卸其行政責任。

尚須指出者，調查統計本身即是一種『猜』的技術，如何『猜出真相』是技術也是本領，關鍵在於『機率論』(PROBABILITY THEORY)架構上，因而不論其問卷設計及抽樣方法如何周延，均有受所抽取樣本『欺騙』之可能，此即統計決策理論上所謂的風險。此種風險是任何問卷調查本質上所無法克服者，縱使因此而無法得到所謂的真相，亦不該情緒性地指責問卷調查者蓄意『欺騙』，製造假象，更何況在無任何有利證據反駁該調查結果爲錯誤之前，便動之以情緒化的詰責，實在有欠公允。總覺得批評的人似乎多了一點情緒，少了一點學術氣息，多了一點個人主觀學術立場，而少就問卷調查程序作客觀之批評。

國內民意調查方興未艾，國內著名之調查機構，民眾及學者對其問卷調查仍不免於懷疑與質問，此爲正常現象不足爲奇，且民眾對所謂『民意黑盒子』存有疑慮之際，任何問卷調查機構，在問卷設計分析及結果之批判，應對自我之問卷調查及代表性多加研究探討，如此始能退去其神祕面紗，讓民眾瞭解何謂『民意調查』。

有深厚統計基礎爲背景，民調可以相當準確

台灣選舉眾多，選舉民意調查漸漸成爲一種專業。而參選時個個有希望，人人沒把握，現在選舉，除了靠候選人個人條件外，也得靠一些專業技巧—民意調查就是瞭解政黨、候選人實力的最好方式，讓各政黨、候選人將精力做最有效的運用。有了民調可以使參選人或政黨知己知彼、爭得民心、贏得選舉，因此成爲政治人物難以忽視的工具。

以1996年台灣地區第一屆「總統大選」所作的民意調查及投票(得票)率推估爲例，有深厚統計基礎爲背景的選舉民調可以相當地準確。1996年總統大選前，由TVBS民意調查中心及輔仁大學統計系民意調查組所作的民意調查及統計推估結果顯示，選前李登輝的得票率爲53.9%與選後實際的得票率54%非常吻合，誤差僅在0.1%（請見表1）。

表1　1996年台灣地區第一屆「總統大選」民意調查得票率推估

1996年	三月廿、廿一、廿二日	三月廿三日
候選人	TVBS民意調查預測得票率	總統大選實際得票率
1陳履安	10.1%	10.0%
2李登輝	53.9%	54.0%
3彭明敏	20.8%	21.1%
4林洋港	15.2%	14.9%

1996年三月廿日至三月廿二日三天共抽樣訪問全省二十歲以上成年男女3,442人
在95%信賴區間，抽樣誤差爲±1.7%

難以捉摸的棄保效應

2000年正副總統選舉剛剛落幕，這次選舉選情激烈，雖然各家選前民調結果有些許差異，但不可諱言的，連蕭配、陳呂配及宋張配三組候選人的支持度明顯呈現三強鼎立的局面。事件的發生會影響民眾投票意向是大家都可以理解的，但是「棄保效應」又是如何發生的?以ＴＶＢＳ選前一天的民調，有33%的選民不希望陳水扁當選，有27%不希望宋楚瑜當選。由於不願意扁、宋當選者各占三成，形成兩股對峙的勢力，當不喜歡的候選人聲勢逐漸高漲時，爲了避免讓他當選，棄保的念頭油然而生。

另一項證明「棄連效應」的發生是，調查結果也顯示北部的選民高達39%不希望陳水扁當選，而南部的選民則是高達37%不希望宋楚瑜當選，這個現象也呼應了最後開票結果，宋楚瑜在北部縣市領先，而陳水扁在南部縣市超強，而連戰則不論南北都敬陪末座。ＴＶＢＳ在選後次日的民調也印證了確有棄保效應。調查發現，當問到選民是否有所謂的棄誰保誰時，４%的選民承認自己是棄連保扁，而另有５%則承認棄連保宋。換句話說，連戰至少有９%的得票率被棄掉了。值得探討的是，什麼因素造成棄保效應？

中選會規定選前十天不准發佈民調，是擔心影響選情，但結果可能適得其反。因爲選情緊繃，而最後十日又發生許多重大事件，例如：李遠哲同意擔任陳水扁的國政顧問，朱鎔基召開記者會表達強硬態度，面對這些重大事件，民眾卻沒有任何數據或資訊可供參考，反而造成謠言滿天飛，選民最後只好憑著自己的臆測及各候選人的造勢聲勢決定棄誰保誰，這有可能就是造成「棄連效應」的發生原因。

然而每一次的選舉棄保效應都是最爲關鍵的因素，它的難以估計及預測，往往會讓選情有逆轉的可能性，而這也是常常致使民眾誤認爲選舉民調不可信的原因。雖然在調查統計的過程中，有太多的因素及變數可能導致誤差的發生，但唯有尊重科學程序及統計專業的民意調查才能洞悉最新，最正確的民意趨勢。

結語

國內民意調查方興未艾，著名之調查機構、民眾及學者對其問卷調查能不免於懷疑與質問，此爲正常現象不足爲怪，且民眾對所謂『民意黑盒子』能存有疑慮之際，任何問卷調查機構，在問卷設計分析及結果之批判，應對自我之問卷調查及代表性在多加研究探討，如此始能退去其神祕面紗，讓民眾瞭解何謂『民意調查』。

然而爲了防止候選人利用民調影響選舉，「總統副總統選舉罷免法」明定政黨及任何人或法人代表，不得於投票日前十日內，發布有關候選人或選舉之民意資料，不過，這些規定並沒有出現在其他選舉適用的選罷法中，以致應該中立客觀的民調，反成了選舉攻訐的工具。

面對民調可能會淪爲政治性工具的問題，調查工作者需要具有相當的道德勇氣。民意調查本來應該是具有「倚天劍」、「屠龍刀」的功能，不過因爲人們的濫用，被拿來當「菜刀」使用，這是非常不恰當的。民調應該受到嚴格的監督，媒體在報導民調時，亦應謹慎，以免誤導民眾。

編者後誌：

本文是謝邦昌教授「民意調查中統計分析的一些問題」原作，由曹振海修編完成。

表2　候選人支持度變化

候選人 支持度	連戰 （連蕭）	陳水扁 （陳呂）	宋楚瑜 （宋張）	李敖 （李馮）	許信良 （許朱）	未表態
1/27-1/28	23.6%	25.5%	26.5%	0.6%	1.0%	22.8%
2/10	25.4%	25.4%	24.7%	0.6%	1.1%	22.8%
2/12-2/13	24.3%	26.6%	23.9%	0.3%	1.0%	23.8%
2/22	21.1%	27.3%	25.6%	0.3%	0.4%	25.3%
2/26-2/27	22.7%	23.4%	22.0%	0.6%	1.0%	30.3%
2/28	21.9%	22.3%	20.8%	0.7%	0.7%	33.5%
3/5	22.9%	24.8%	23.9%	0.7%	1.3%	26.4%
3/11-3/13	24.2%	26.0%	22.1%	0.8%	0.8%	26.1%
3/15-3/16	24.8%	21.3%	21.7%	0.9%	1.6%	29.7%
3/18	17.3%	34.2%	26.4%	0.2%	0.5%	21.5%
選舉結果	23.1%	39.3%	36.8%	0.13%	0.63%	NA

表3 選前兩個月重大政治事件

日　期	政　治　事　件
1/20	新黨敲定李馮配
1/23—1/24	劉松藩表態挺宋。廖正豪退出國民黨
1/27	宋競選總部正式成立 。連蕭登記參選
1/30—2/1	李敖完成登記。雙良配完成參選登記
2/2	林瑞圖：宋楚瑜家人在加州有5棟房子
2/10	監院調查興票案報告出爐
2/12	吳伯雄挺連
2/20	總統大選首場電視政見會
2/21	中共發布一個中國白皮書。傅學鵬公開挺宋
2/22	林瑞圖舉證陳水扁曾爲彩券取財2億
2/22	廣三案 劉松藩：政治迫害 莊深淵：還原犯罪原貌
2/25—2/26	鍾榮吉辭官退黨挺宋。副總統候選人電視政見會
2/28	陳履安挺連
2/29	陳天福告阿扁。北台灣運匠（司機）後援會挺扁
3/4	第二場總統候選人電視政見發表會
3/5	李遠哲：讓兩岸和平發展
3/6	鍾榮吉表態挺宋
3/8	本日起總統民調不得發佈
3/9	顏清標公開挺宋
3/10	李遠哲同意擔任陳水扁國政顧問團
3/16	朱鎔基召開記者會表達強硬態度
3/18	中華民國第十屆總統大選
3/18	陳水扁與呂秀蓮以39%的得票率順利當選中華民國第十屆總統

圖表資料來源：勁報民調中心與輔仁大學統計系

2000中華民國總統大選民調觀察

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一、前言

今（2000）年中華民國第十屆總統大選很順利地於三月十八日由全國民眾選出，當選人爲陳水扁先生。此番選舉可說是歷來最爲激烈的一次，不僅吸引了國內全體民眾的目光，甚至連海峽對岸的中國大陸也企圖影響此次選舉的結果；另外，此次選舉也影響了國際視聽，各大國際媒體也做了詳盡且完整的報導。因爲此次選舉不僅改變了國內長久以來由國民黨執政的政治生態，更是牽動了世界各主要國內的政治神經。

各項民意調查的結果在這場激烈的總統大選之中，常被一般民眾直接當作是選舉結果的預測指標，甚至被各候選陣營或政黨拿來當作吸引未表態選民的利器，以致造成民調被過度推論的現象。另方面，這次總統大選選前最後的三個月的民意調查，不論是各家民調，都顯示這次選舉呈現著三強鼎立的局面，陳水扁、宋楚瑜及連戰的直接支持度都一直維持在二成至二成五左右的比例，但是都在百分之三的抽樣誤差之內，因此以統計的觀點而言並無法說明到底誰的支持度比較高，這更突顯了民意調查在此次總統大選中的重要性與爭議性。

在選舉的最後幾天的造勢活動中，各候選陣營都宣佈說自己的支持度是第一。雖然我們並不知道他們的民調結果是怎麼得來的，也不知道他們是怎麼估計出來的，也或許這是西瓜效應與棄保效應的選戰策略。但是很明顯的這次總統大選的選舉結果似乎與當初民調結果有些許的差異，我們在此所說的差異並不是指誰當選或者是誰落選，本文的目的也不是想要以民調來預測總統大選的選舉結果，而是想要探討這次2000年總統大選民調的客觀性與公正性。

二、2000年總統大選民調趨勢變化—重大事件影響

探討此次總統大選民調的情形，我們必須了解大選前民調的趨勢變化，本文綜合了三間民調中心所做的調查，分別是輔仁大學統計系（10次）、TVBS民調中心（36次）及聯合報民調中心（39次），見圖1。照此三個單位所作的選前民調可發現，大選前的民調的趨勢變化大致以中興票券案(十二月十日）風波作爲分水嶺，可分成兩階段，第一階段爲中興票券案發生之前，第二階段爲中興票券案發生之後。

第一階段（興票案前）--宋楚瑜獨走局面

從選前一年到興票案爆發前宋楚瑜先生就以三成以上將近四成，超高人氣的支持度遙遙領先其他組的對手，且一直居高不下可說是一枝獨秀的局面，在此階段中陳水扁的支持度一直維持在二成上下震盪，而連戰則是從一成五左右的支持度緩慢的爬升到二成多的比例。

其間，在九二一大地震之後的五週，根據TVBS最新的民調結果發現，宋楚瑜的支持度爲35%，連戰的支持度爲23%，陳水扁爲22%，這是自8月15日連宋造勢後，連戰支持度首次超越陳水扁。這可能是與地震救災工作有關，因爲連戰身爲副總統並以救災總指揮的身分參與救災及災後重建的工作，獲得了媒體與選民的目光與注意，增加了曝光率也使得連戰的支持度稍微上漲；相對的，其他候選人因爲並不是現任的政府官員，而缺少了直接參與救災的工作，也減少了在媒體上曝光的機會，使得支持度並未向上爬升。

第二階段（興票案後）--三強鼎立局面

十二月初興票案爆發後，宋楚瑜的誠信即刻遭到民眾的質疑且一直遭受國民黨的強烈攻擊，這種現象也反應到他的支持度從一直維持在三成以上的支持度迅速的往下掉，掉到了約二成五左右的支持度。此時另兩位主要的候選人陳水扁與連戰，也在這個階段中極力吸收宋楚瑜的票源，也使得三人間的差距迅速縮小，造成三強鼎立的局面，這種局面持續地維持到選前十天的民調都難以分出究竟誰會勝出。

而此次總統大選選前民調的結果，雖然各家民調結果有些許差異，但不可諱言的，連戰、陳水扁及宋楚瑜等三組主要候選人的支持度明顯呈現三強鼎立的局面。國民黨的連戰均維持在二成一至二成五左右，其支持度的趨勢變化較其他主要兩組候選人較小，維持著較穩定的狀態。而民進黨陳水扁的支持度原本一直維持在二成五以上到二成七左右的比例，但自從中共宣佈「對台政策白皮書」之後，支持度下滑了約四到五個百分比，使得一些支持民眾趨於保守而未表態。另一方面，獨立參選的宋楚瑜歷經興票案的重創之後有從谷底慢慢回升的趨勢，但似乎又因爲陳履安挺連的影響，使得其支持民眾又趨於保守，其支持度又降回二成一左右。其餘兩組的總統候選人李敖與許信良的支持度均一

直維持在一個百分比左右。3月10日李遠哲挺扁後三人的支持度均有上升趨勢，而以陳水扁的支持度上升2%最高，可見李遠哲效應亦存在某些程度的震撼性，且此效應持續的在發酵當中。

未表態選民-- 勝選關鍵

但是值得注意的是，選民面對每天有不同的政治事件發生，心裡對各組總統候選人的考量又會重新評估一番，尤其又經過「中共對台政策白皮書」及「陳履安挺連」重大事件的影響，使得陳水扁與宋楚瑜的支持民眾趨於保守而未明確表達支持的候選人（似乎也透露著「棄保效應」的訊息），因此未表態選民的比例由一月底的二成三左右上升至將近三成四的比例，3月10日李遠哲挺扁後未決定的未表態選民仍然有30%左右，由此可看出越到3月18日的大選時間，民眾越持保留態度，越需要審慎思考心目中最理想的總統候選人。而這些高達三成的未表態選民一直就被認爲是決定選戰最後結果的最關鍵因素，某一組候選人若能獲得大部分未表態選民的支持，則必能贏得總統的寶座。

果不其然，當選舉結果揭曉時，原本一直被民眾認爲最有可能當選的連戰，其得票率與選前民調支持度的結果差異不大，似乎僅僅只吸引到基本固定的支持選民，對於未表態選民的吸引效果似乎沒發揮任何作用。另方面，由選舉結果可發現，棄保效應似乎真的發生了，而未表態選民的選票也似乎被陳水扁與宋楚瑜兩組候選人所共同瓜分，並且陳水扁所得的票數些許的超越了宋楚瑜，選舉結果爲連戰23.1%，宋楚瑜36.8%，陳水扁39.3%，因此陳水扁順利地當上中華民國第十任的總統。

三、台灣地區民調之問題

民意調查記錄了全部或一部份的選舉過程，因此，民意調查在選舉期間的使用，不僅要注意民調的執行過程、分析、預測結果及解讀，更要注意社會心理效應、重大事件發生及選舉策略等投票行爲的研究。

而此次總統大選之後，各方輿論對於民調的結果多所批評。有人說部份媒體與民調是最大輸家，認爲民意調查在台灣已經被視爲政治工具。更有些學者指出民調在選戰中被過度操控，公信力全失，連最起碼的把關都沒有做到。師大大眾傳播研究所教授胡幼偉指出，台灣賽馬式的民調，使得新聞處理時，常會出現曲解民調的情況，他建議新聞界應加強自身解讀民調的能力。而世新大學民調中心主任梁世武表示，民意調查是專家的事。於此我們想說的是應如何來解讀這些民調的客觀性與公正性。

一般民眾常會把民調結果當作是選舉預測的指標，總認爲誰的民調支持度高，誰就會當選。並且總會以成敗論英雄，如果民調結果與選舉結果不一致時，就會覺得民調根本就是在作假，全然不可信，此種說法實在有些鄉愿。沒錯，各家民調的結果會有所不同，當然也會有準與不準的差別，但我們又要以何種角度來看待這些民調呢？

陳義彥(1992)的研究也指出，但在臺灣地區從事選前預測常常是困難重重，其主要原因不外乎下列幾點：(1)國人個性保守，對某些問題不願明白表示意見；(2)對某些政治問題敏感，導致民調結果常有百分之四十甚至百分之五十表示「不知道」、「無意見」、「尚未決定」或「拒答」；(3)各黨選前機動配票，有可能在選前一兩天改變，這種改變常是候選人當選與否的重要決定性因素；(4)賄選、綁樁通常到了最後一刻仍有其影響力，但選舉調查卻不易掌握相關資訊；(5)重大事件的發生對選民轉變的程度，尤其是選舉日前數天，是民調難以測量的主要部份（梁世武、吳統雄、石崇賢，1995）。

上述五點雖然說明了在台灣進行選舉預測的困難度，雖然隨著民主風氣漸漸的盛行，民眾也越來越願意表達自己的意見，使得未表態選民的比例也漸漸的遞減。另方面，爲了使預測更爲準確，國內許多的政治研究學者及選舉預測研究學者仍對預測之研究方法、技術、變數建構上不斷創新，企圖能以更科學、客觀的方法探求民隱，但在某些時候，仍無法正確地反應社會真實，最主要的因素是受了「未表態選民」的影響與「棄保效應」的發揮。

事實上，我們看民調應該只是看它的趨勢，也就是民意的趨勢，而非對其數字斤斤計較。如聯合報民意調查中心在八十八年五月七日至八月十五日所做的2000年總統大選支持度趨勢我們可以看出，民眾對宋楚瑜的支持度有些許下滑的趨勢，對連戰的支持度則有些許上升之趨勢，陳水扁及許信良則持平，未表態者維持在三成左右。若就TVBS民意調查中心在八十八年五月十日至八月十五日所做的2000年總統大選支持度趨勢我們可以看出，民眾對宋楚瑜的支持度同樣有些許下滑的趨勢，對連戰的支持度同樣有些許上升之趨勢，陳水扁則有些許下滑的趨勢，許信良則持平，未表態者維持在二成左右。這是長期追蹤調查的結果，民眾及觀察者可由此趨勢看出民意之所在，而非以單一次的民調來下定論。

然在解讀民調時，並非以單一數字來看，應考慮抽樣誤差，例如在95%的信賴水準下，成功的訪問了1,067個樣本，所得的抽樣誤差爲正負3個百分點，如甲侯選人的支持比例爲35%，乙侯選人的支持比例爲32%，我們不能說甲

侯選人的支持比例一定領先乙候選人，因爲如果用抽樣誤差3%來估計，則支持甲侯選人比例應該在32%到38%之間，支持乙侯選人比例應該在29%到35%之間，所以兩種百分率區間有重疊之處。

另要比較不同機構所做的民調，必須考量其調查時間、調查方法是否相同，若一個爲隨機抽樣，另一個爲滾動式抽樣，則不能做比較；因爲民意如流水，故民調可能因時空不同，發生某事件的關係，而有不同的結果，故時間不同亦無法做比較。

四、結語

觀察這次中華民國第十任總統副總統選舉可發現，無論是在觀察選情方面、了解民意走向方面、選情預測研究方面或選戰策略擬定方面等等，「民意調查」著實扮演了極重要的角色。既然民調扮演了這麼重要的角色，實在不應該將民調視爲是政治的工具，民調應該是屬於超然神聖的，應該是用來作爲了解民意走向專業的科學方法。而國內從事民調的機構應該學習民調最發達的美國，強調「信用即是生命」，莫再玩文字遊戲，而應重視文字本身的內涵及其所賴以發揮的統計分析結果。一旦民眾對民意調查失去了信心之後，若要再建立一個可供信賴的調查環境是極度困難的，畢竟要在國內建立一個可信賴的民意調查的環境，需要長時間的栽培與灌溉。

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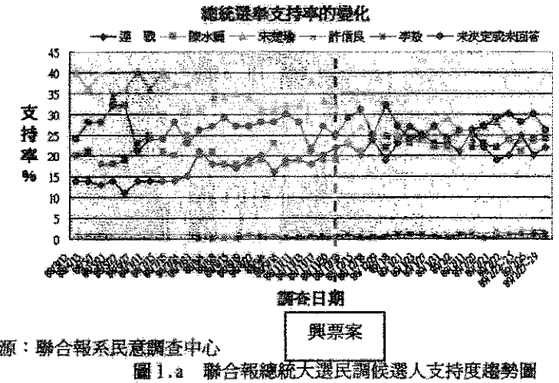
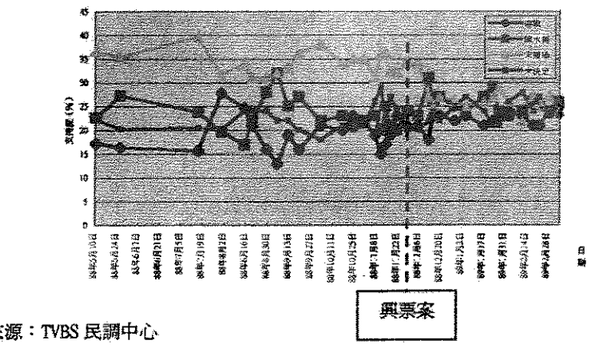


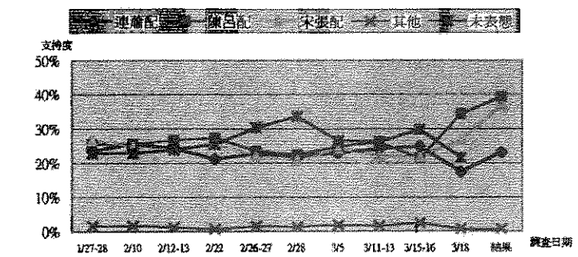
資料來源：聯合報系民意調查中心

圖 1.a 聯合報總統大選民調候選人支持度趨勢圖



資料來源：TVBS 民調中心

圖 1.b TVBS 總統大選民調候選人支持度趨勢圖



資料來源：輔仁大學統計系

圖 1.c 輔大統計總統大選民調候選人支持度趨勢圖

選舉預測模型

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中華民國第十任總統、副總統選舉結果於民國八十九年三月十八日揭曉，這場全球矚目的台灣世紀大選終告落幕，然而對選舉研究工作者而言卻是新的開始。選舉預測居選戰中重要的一環，也提供了一個驗證選民投票行為理論的絕佳機會，但由於它在投票結束，便有答案，對研究學者之挑戰程度不言可喻。因此如何結合理論、方法及事實三者為一體的努力，對選舉預測更是別具意義。

一、第十任總統選舉之概述

這場跨世紀總統大選自始至終是一個「三人賽局」，「分裂的國民黨」面對「團結的民進黨」，由於三位競爭者彼此實力接近，游離選民數目龐大，經常超越任何一組的支持人數，因此選舉的結局實在難以預測。若進一步審視整個競選過程，脫黨參選的宋楚瑜曾是李登輝的主要助手，歷任黨政要職。他的獨立參選代表泛國民黨力量的分裂，在這其中，基本上民進黨的陳水扁獲得結構性的優勢。在去年底前，宋楚瑜的歷次民調皆是遙遙領先其餘各組候選人，然而在經過興票案的打擊，他的高支持度下跌至扁與連的程度，連宋分散了泛國民黨的選票，從而給予扁勝選的機會，一直到選前一個月左右，選戰的主軸都是連宋為了泛國民黨的選票而相爭，而這是對於民進黨有利之處，但由於民進黨的台獨主張仍然讓許多選民疑懼，一直到最後競選階段都是呈現三強鼎立的態勢。

而由於連戰急於在泛國民黨陣營中爭奪選票，希望運用國民黨外省籍大老的支持來挖取宋楚瑜的選票，但由於李遠哲在三月十一日對陳水扁表達公開的支持，且李登輝的一群好友又參加陳水扁的國策顧問團，於是李登輝對於連戰的支持受到普遍的懷疑，陳水扁也開始蠶食他的選票，宋楚瑜也不斷指出連戰已經被李登輝所拋棄，即所謂的「棄連保扁」的效應便應運而生，而中共總理朱鎔基在三月十五日聲色俱厲的對台灣的選舉發出警告，似乎也造成連的選票開始大量出走，一部份的本土票流到扁陣營，大部分的泛國民黨則流向宋楚瑜。連宋相爭的結果，宋是贏家，這種態勢透過耳語傳播開來，使這種趨勢更加明顯。在選前十天，扁獲得李遠哲的背書，真正開始突破民進黨在全國性選舉的得票率極限，李遠哲被用來證明民進黨有能力可以處理國政，李遠哲的國際形象和與大陸領導人的會面經驗都成為陳水扁修補罩門的重要工具。於是陳水扁的支持度急速攀升，開始獲得地方選舉中民進黨的傳統支持度，隱隱然預言了選舉的勝利。然而對這樣的發展，股票市場和對岸都產生反彈，選舉當週的星期一股市破紀錄的大跌，顯示投資人對於陳水扁可能當選的疑懼，以及中共總理朱鎔基聲色俱厲的警告，這兩項衝擊，似乎並沒有打擊到扁的支持者，股市在安定基金的拉抬下迅速走穩，而朱鎔基的威脅反而讓反感中共的選民更堅定支持陳水扁。

因此到了投票日的時候，連戰的選票小部分鬆動而流向陳水扁，大部分因為棄保而流向了宋楚瑜，連戰的支持者被掏空，僅獲得23.1%的支持，宋楚瑜雖然在泛國民黨陣營中勝出，得到36.8%的選民支持，但是由於連戰崩潰的不徹底，所以比起陳水扁所獲得的39.3%，還是輸了三十一萬票。但儘管如此，宋楚瑜雖以四百六十餘萬票高票落選，但在15個縣市領先，且較國民黨連戰高出一百五十萬票以上，可謂雖敗猶榮。選前三位主要候選人是「三強鼎立」，但由於宋楚瑜的團隊及其支持者的擁護，「親民黨」的成立似乎也宣告選後台灣的政治版圖一樣呈現「鼎足而三」的趨勢。

在總統大選各候選人宣布參選時，宋楚瑜的支持度是大幅領先其餘各候選人，一路領先，幾乎所有民調皆顯示宋楚瑜的高度支持率，然而政治現實的多變，使得其仍以第二高票而落選，一般認為「興票事件」是宋楚瑜民意支持度重挫的關鍵，然而選舉末期各式抹黑、耳語、棄保及中共恫嚇逐一出現，股市重挫與李遠哲效應浮現，未到開票結果誰也無法預知誰是最後贏家。從整個選舉來看，一般分析認為決定結局有幾個關鍵：（1）國民黨分裂造成三人選局；（2）興票案使得宋楚瑜無法持續領先，也使得棄保效應無法較早發酵，使得連宋之間缺乏決定性的勝負；（3）李遠哲效應加大了陳水扁的支持度，使泛國民黨陣營的總版圖縮小，因此到最後，連宋間棄保的程度趕不上扁支持度的增加，於是連宋都敗下陣來，民進黨在攸關台灣命運的總統選戰中擊敗了國民黨，也開啓政黨輪替之門。

二、文獻檢閱（台灣的選舉預測模型）

台灣地區在民國70年代以前的選舉，似乎不需要做選舉預測，因為威權時期長期執政的國民黨掌握了當時大部分台灣社會的資源，候選人只要獲得提名就大多能夠獲得當選，然而民國80年代以來台灣地區幾乎每年都有選舉，面對越來越大的時代衝擊及選舉壓力，如何能正確預測選情，近來也成為政治人物、報章媒體、研究機構甚至是普通市井小民的興趣。

政黨競爭激化使選舉預測大量興起，近幾年來，國內政黨已開始重視民意調查的選舉預測功能，亦將民意調查之

結果與發現，作爲「提名候選人」、「競爭者配對分析」、「選票策略分析」及「評估候選人得票率」等用途。政黨競爭與選舉預測將成因果互動之關係。準確的預測方法及結果，得以估算出當時各候選人的狀況，以供決策者正確地掌握選情、調整策略、贏得選戰。因此選舉預測的功用之一，在於提供候選人及政黨在競選時調整競選策略的依據，但選前預測結果與據以修正競選策略並努力競選後所得的投票結果應該有顯著的差異。這種情形下，不知情的人看來，稍早的預測就很不正確。

在台灣，「選舉預測」這個主題是最近這十幾年來才逐漸蓬勃興起的一門學問，可說是高度科際整合的領域，在其中有不少的政治、統計、資訊相關領域學者投入其中，也有不少的研究成果發表。

(1) 從政治學角度出發的預測模式，可歸類如下幾種類型
(1)
因果關係漏斗預測模型（FC，Funnel of Causality Predictive Model）
(2)
政治版圖亞當預測模型（ADAM，Aggregate Data Assisted Predictive Model）
(3)
候選人形象預測模型（CI，Candidate's Image Predictive Model）
(4) 階層式輔助變數模型
(5) 特質調整模型（JIA model）

(2) 以統計學方法進一步延伸應用的選舉預測模式，可歸類出以下幾種方法

(1)
分類性多變量分析預測模型（LOGIT，Logit Predictive Model）
(2)
區辨分析預測法（Discriminant Analysis）
(3) 區隔分析（CHAID，Chi-Squared Automatic Interaction Detector）應用模式
(4) 統計推估預測模式
(5) 模糊統計(Fuzzy Statistics)分析運用

(3) 社會心理、行銷學、實戰經驗等方面，研究途徑相當不同的模式：

(1)
選民結構預測模型（SE，The Structure of Electorate Predictive Model）
(2) 候選人勝選因素分析模型
(3) 基因模型
(4) 趨勢線預測法
(5) 選戰實務經驗評估
(6)
選民需求指標選舉預測模式

除了上述之選舉預測模型外，國內有關選舉預測的論述及研究實不在少數，但所有理論模型都必須經過選戰的考驗及因應時勢做些修正調整，因此建立選舉預測的模型，實是件繁瑣艱難的工作，然而選舉預測的功用之一，既是在提供候選人及政黨在競選時調整競選策略的依據，除非我們認爲競選的作爲成效極微，否則選前預測的結果與據以修正競選策略並努力競選後所得的投票結果應該有些許的差異。因此選前所做預測要與實際得票情形相當吻合實是一件難事。總之，預測模式之建構，在方法及工具的應用上，可以有不同的結合，但究竟以何者爲佳，端看預測者對選民行爲法則的瞭解及研究設計而定，且不管以何種預測模型皆應隨著選舉型態、各個縣市的政治勢力、民俗背景、區域文化的不同而應有所調整，然而儘管各種預測得票率的方法雖有不同，其目的皆欲獲得較準確的預測法則。

三、選舉預測模型預測結果與實際開票結果綜合之比較

由表一的預測結果比較看來，一般選舉模型的預測結果相當不理想。選前多項民調結果三位候選人的支持度皆在抽樣誤差範圍內，不分軒輊，但實際開票結果卻差異懸殊，其中連戰的得票率不如預期理想，是大家始料未及，然而面臨這樣的結果，我們不禁要懷疑資料的本身似乎並未正確反應選民的心理，或者是說，面對激戰的選情，選民的心理已起了相當的變化，而由於資料蒐集的電訪過程是在選前一、二週前所執行的，離選舉尚有一段不少的時日，而根據多位學者專家對此次選舉所做檢討及分析，皆認爲「棄保效應」發酵是最具關鍵性的影響，因此以下我們將針對棄保效應的發酵，對此作一探討。

棄保效應在選前幾天開始發酵，這是一般研究在進行資料蒐集時，未能測知的變數，選前一星期的李遠哲效應、中共總理朱鎔基聲色俱厲的談話、股市崩盤效應，各式耳語在坊間流傳，都使得策略性投票即所謂的棄保效應發酵，而連戰的票源既被泛國民黨陣營的宋楚瑜所瓜分，也爲陳水扁所謂「承襲李登輝路線」及具改革魄力的形象深入民心而侵蝕國民黨固有票源，在選後多位學者針對此次大選的討論，皆認爲「棄連保扁」及「棄連保宋」兩邊效應同時發酵，似乎可解釋連戰爲何得票率如此低的一部份原因，因而進行固定樣本連續訪問（PANEL）選後電訪的問卷也針對「棄保效應」設計一道題目爲「總統選舉請問您是投給哪一位候選人？」再與選前電訪的問卷題目爲「如果明天投票，會把票投給誰？」作一交叉分析，藉著這樣的訊息，研究受訪者策略性投票的可能性。根據下列資料顯示選前電訪表態支持連戰的受訪者有7.9%的比例將選票改投給宋楚瑜，而有14.7%的受訪者將選票改投給陳水扁。且根據TBVS的選後次日民調也印證確有棄保效應發生，因此若沒有棄保效應，三人得票率應在抽樣誤差範圍內，更顯得選情膠著，然而棄保效應的發酵亦是在民調中無法偵測的。

四、結論

許多學門或領域都有理想與實務的差距，選民投票行爲的研究便是其中之一，學者經常掛在嘴邊的政黨認同、議題與政見、候選人形象等等，在面對詭譎多變的選舉，可能不是這麼一回事，組織動員、棄保效應和坊間耳語皆使得選民投票行爲背後的心理因素複雜難以預料，選舉的複雜性自是深不可測，不同層級的選舉會因地緣、人情、候選人特質以及利益分配的考量，使選民投票抉擇的因素更多元，甚至超過理念主張或者是政黨認同之上，因此選舉預測模型究竟應以哪一層次的選舉來作爲定位才合理？由於以電話爲調查工具的民意調查已是潮流，完全以民意調查爲依據的選舉預測最大的盲點是無法偵測到基層綁樁、買票或棄保效應發酵的影響力，因此民意調查有時可能根本派不上用場，故以民意調查資料所做的選舉預測便面臨相當的考驗，除了預測模型的建構理論外，資料品質的重要性更是不可言喻。

一套完整的選舉預測模型研究，應包含問卷設計、抽樣訪問、資料處理、加權除錯、模型設計與預測評估等整套的研究流程，然而學者所運用的選舉預測模型在此次總統大選中並未達到預期的功效，意謂著在整個研究流程中有其不周延待改進的地方，儘管有些學者在選前提出有可能會出現棄保效應的策略

性投票，然而若未在選前偵測出棄保發酵的可能性，則選舉預測將可能面臨全然的失敗。公元2000年選舉預測已普遍報導與興盛，規範選舉選舉期間的民意調查報導，累積選舉預測的知識與經驗，建立選舉民意調查公信力，也是大家需努力的方向。

圖表(一)

選舉預測模型	候選人					平均絕對誤差（%）
	宋楚瑜	連戰	李敖	許信良	陳水扁	
1. 政治版圖預測模型	30.5%	31.9%	1.5%	1.8%	34.2%	4.536
2. 形象認知	29.67%	30.87%	2.12%	4.58%	32.77%	5.482
3. Logit	29.00%	35.50%	1.51%	3.02%	34.18%	5.826
4. 離散區辨分析	32.69%	29.97%	0.70%	1.48%	35.17%	3.314
5. 模糊統計分析	33.15%	34.06%	0.00%	0.00%	32.78%	4.386
6. 基因	24.45%	25.63%	9.65%	9.20%	31.08%	8.246
7. 特殊議題	35.29%	23.21%	0.66%	1.40%	39.45%	0.624
8. 得分指標	32.25%	29.01%	0.62%	1.68%	36.43%	2.982
實際開票結果	36.84%	23.10%	0.13%	0.63%	39.30%	

圖表(二)

		總統選舉您是投給哪一位？						
		宋楚瑜	連戰	李敖	許信良	陳水扁	無反應	總和
如果明天投票，會把票投給誰？ 宋楚瑜	個數	702	27	1	0	51	75	856
	橫列%	82.0%	3.2%	1%	0%	5.0%	8.8%	100.0%
連戰	個數	61	497	0	2	114	101	775
	橫列%	7.9%	64.1%	0%	3%	14.7%	13.0%	100.0%
李敖	個數	20	4	3	1	9	12	49
	橫列%	40.8%	8.2%	6.1%	2.0%	18.4%	24.5%	100.0%
許信良	個數	17	11	0	14	13	10	65
	橫列%	26.2%	16.9%	0%	21.5%	20.0%	15.4%	100.0%
陳水扁	個數	19	14	0	2	781	72	888
	橫列%	2.1%	1.6%	0%	2%	88.0%	8.1%	100.0%
無反應	個數	167	107	1	1	247	265	788
	橫列%	21.2%	13.6%	1%	1%	31.3%	33.6%	100.0%
總和	個數	986	660	5	20	1215	535	3421
	橫列%	28.8%	19.3%	1%	6%	35.5%	15.6%	100.0%

!!! Controversial !!!
Statistical
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Bayesian Approach in Clinical Trial

Bayesian Methods in Health Technology Assessment -- the Case of Clinical Trials

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Introduction

Standard statistical practice for the design, monitoring and reporting of controlled clinical trials are founded on the Neyman and Pearson frequentist theory of hypothesis testing (36).

Kadane (29) argues that there are distinct advantageous aspects of the Bayesian approach with specific reference to the area of clinical trials, and that advances in Bayesian technology (20, 22) have made Bayesian inference a practical inferential tool.

In a key read paper Spiegelhalter et al (42) argue that that historical and continuing debate on the frequentist vs the Bayesian approach to clinical trials (4, 13, 46) is largely ideological and that a pragmatic approach is realistic to the conduct of trials. They concentrate on the areas of monitoring and reporting of clinical trials as this is where the differences between the two methods is greatest.

The discussion on this paper is wide-ranging and illuminating and testifies to the interest and perceived relevance of Bayesian methodology in clinical trials.

Another important point of reference is the special issue of Statistics in Medicine (44) dedicated to papers on the pros and cons of the Bayesian approach to clinical trials.

In this short review, we attempt to summarize the current status of the Bayesian approach to clinical trials. To be concise, the methodology is discussed thinking mainly of two parallel groups in a fixed sample or sequential setting. This is not to say that Bayesian methods are not relevant to other types of design such as cross-over, equivalence, N of 1 and factorial trials and Phase IV safety monitoring (24, 25, 27, 40, 48). Neither is there space for discussion on the decision theoretic approach using loss functions (3, 6, 7, 8, 32, 46), and the relevance to Phase I, II and III trials.

It is hoped that the references cited will provide a guide for interested researchers

to assess the possible advantages of the Bayesian approach in the clinical trials setting. Again, to be concise, technical details will be kept to a minimum.

Main Issues

The main differences between the frequentist and Bayesian approaches occur in the monitoring and reporting of clinical trials. We summarize these issues as they are addressed in (42).

The frequentist approach uses type I and type II error for trial design and *p*-values and confidence intervals for analysis. The Bayesian approach specifies a prior probability function on the parameters and moves to the posterior probability function through the combination of the prior with the likelihood in Bayes's formula. Treatments can then be compared by computing probabilities for clinical equivalence or difference, based on the posterior probability function and associated credible intervals (i.e. direct probability interpretation of the results.)

Interim analyses can be made easily at any time using the current posterior probability function and are not affected in their Bayesian form by the number of interim analyses. Interim Bayesian prediction can be made by use of predictive probability. These are an aid to deciding on the continuation or stopping of a trial.

The power of the design can be expressed in Bayesian terms by pretrial predictions based on the prior. This is known as predictive power.

Table 1 - Summary comparison of frequentist and Bayesian methods in clinical trials

Issue	Frequentist	Bayesian
External information	Informally used in design	Used formally by specifying a prior probability distribution
Parameter	A fixed state of nature	An unknown quantity which can have a probability distribution
Basic question	"How likely are these data given a particular value of the parameter?"	"How likely is a particular value of the parameter given these data?
Reporting statistical results	Likelihood functions, *p*-values, confidence intervals	Plots of posterior distributions of the parameter, calculation of specific posterior probabilities of interest, and use of the posterior distribution in formal decision analysis.
Interim analyses	# of analyses dictates overall and nominal significance levels and repeated confidence intervals.	Probability and credible interval calculations not affected by the number or timing of interim analyses.
Interim predictions	Conditional power analyses	Predictive probability of getting a firm conclusion.
Dealing with subsets in trials	Adjusted *p*-values (*e.g.* Bonferroni)	Subset effects shrunk towards zero by a "skeptical" prior

Table 1 gives a summary comparison of the frequentist and Bayesian approaches in relation to clinical trials.

The main criticism of the Bayesian approach is how to choose the prior. This issue is also addressed in (42). The use of different forms of prior such as reference priors, clinical priors, skeptical priors and enthusiastic priors is presented. The motivation is that the interpretation of the current results through the use of the respectively induced posterior probability functions can be used as a basis for discussion of the current status of the trial and as a form of sensitivity analysis.

Applications

We cite references where Bayesian methods have been applied in the RCT setting (1, 2, 5, 9, 10, 11, 12, 14, 15, 16, 17, 18, 19, 21, 23, 26, 28, 30, 31, 33, 34, 35, 37, 38, 39, 41, 43, 45, 47). Reference (47) comes from the authors own experience where Bayes predictive methods were used as an aid in a frequentist group-sequential design.

Discussion

It has not been possible to summarize the evolving role of Bayesian methods in all areas of Health Technology Assessment. Other relevant areas where advances are occurring and should be occurring are:-

Evidence Synthesis, Observational Studies and Strategy, decision and policy making in health research and health care.

As we move into the 21st century, it is clear that the old positions of frequentist vs. Bayesian, at least in the pragmatic approach to clinical trials, is becoming less relevant. The argument here is not "Bayes is best", but simply to alert the reader to "Bayes is a fact of life" is becoming more realistic in clinical trials practice. The constructive interplay of the two philosophies can only help to serve the primary outcome – the patient under study.

Acknowledgement

Table 1 is based on material in personal communication form from David Spiegelhalter as are the references for Bayesian RCT's. Personal thanks are due.

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Conditional Power – A Bayesian Procedure

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In many long-term clinical trials, data are monitored periodically even if the design of the study is fixed. Before the group sequential methods were introduced in the 1970's, many NIH-sponsored trials used the concept of conditional power (CP) as a guideline for interim data analyses. To simplify the discussion, let us assume that a new treatment is tested to show beneficial effects. Based on the observed data, the conditional power is the probability that the final Z-value will fall into the rejection region, which leads to a significant beneficial conclusion for the new treatment. If the ultimate outcome of a trial can be predicted with a high probability, i.e., if the CP is very high or very low, perhaps the trial should be terminated early. Note that when data are monitored, the CP depends on the unknown value of the treatment effect, θ, which determines the distribution of future observations.

During the Data Safety and Monitoring Board (DSMB) meetings, the Statistical Center may present $\{CP(\theta)\}$ for a spectrum of values of θ. The DSMB members then use this information to determine whether the study should be terminated early. A classical Bayesian approach would use the predictive probability – a weighted average of $CP(\theta)$ by the posterior distribution of θ - for consideration of early termination. In practice, I have found that this Bayesian approach was used in a more "informal" way. The DSMB members have different scientific backgrounds, and each member uses his/her own prior distribution which may not be the same for all the members. Second, these members may have different exposure to the new treatment. Note that many clinicians sitting on the DSMB are experts in the medical field being studied; these clinicians may have access to external information about the new treatment, which they are not allowed to share with other members of the DSMB. Finally, when a DSMB member pools all the information available to him/her, he/she may not specifically use the Bayes formula to derive a predictive power, but rather instinctively derive a value and the decision is reflected in their vote on early termination.

To control the α-level, CP should be evaluated at $\theta = 0$. If CP(0) is high, then the use of conditional power to stop early for benefit will only inflate the α-level slightly. This special aspect is only a small part of the CP consideration during the discussion in the DSMB meetings. The 'informal" Bayesian modification as described above and other medical considerations carry much more weight than the control of the α-level in the early stopping decision process.

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Bayesian statistics in clinical trials – Is there a future?

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I work for a pharmaceutical company and therefore it should not be surprising that when addressing the issues of using Bayesian methods in clinical trials I look at them through pharmaceutical eyes as well as Bayesian eyes.

First let us remind ourselves that Bayesian ideas are not new. Thomas Bayes' original paper appeared posthumously in 1763; Laplace in 1774 was using posterior distributions in practical applications; in 1898, when studying uncertainty in estimating the correlation coefficient, Karl Pearson used a Bayesian approach; Gosset (Student) developed the sampling distribution of the correlation coefficient in 1908 to simplify the calculations required to determine the appropriate posterior distribution.

Despite this early work there is little evidence to suggest that in the field of clinical trial methodology Bayesian ideas caught on – a notable exception being Cornfield (1966). Things are however changing. Both in the United States and Europe there has been significant activity in bringing to the attention of practising statisticians the advantages of a Bayesian perspective in clinical trials (Berry,1993; Spiegelhalter et al, 1994).

In drug development Bayesian ideas have until very recently been notable by their absence. Why? Certainly Bayesian methods are now formally acceptable by the major world regulatory authorities. The 1998 ICH Guideline on Statistical Principles in Clinical Trials (E9) says:

" The use of Bayesian and other approaches may be considered when the reasons for their use are clear and when the resulting conclusions are sufficiently robust".

While I for one find this endorsement somewhat lukewarm the door is now open to the use of Bayesian techniques. So what other hindrances could prevent their use? I think there are four major hindrances.

1. Philosophical Objections.

Many statisticians find it hard to accept the use of Bayesian methods because they are based on a view of probability that sees it as a subjective measure of belief rather than the more traditional definition based on repeated sampling. This is certainly a difficulty. However, I believe that any Bayesian Statistician working for a pharmaceutical company needs to remember that he/she is working in a regulatory environment that is "frequentist". A consequence is that such a statistician needs to ensure that their Bayesian methods, even if based on a subjective concept of probability, are calibrated within this "frequentist world". This can be done by simulating from known cases and examining the operating characteristics of the proposed method.

2. Trust

There is a feeling that the use of subjective priors may allow unscrupulous companies and/or their statisticians to try to dupe, or pull the wool over regulators' eyes. I think this is very unlikely. First, as I said above, Bayesian statisticians need to calibrate their methods and I cannot imagine that a method which it can be shown inflates the false positive rates would be acceptable. Secondly, Professor Stephen Senn has pointed out that "nowhere is the discipline of statistics conducted with greater discipline than in the pharmaceutical industry". I believe that this statement will be equally true of Bayesian statistics. Documentation is a creed of pharmaceutical statistics and it will be no different with Bayesian methods. The prior distributions will need to be specified in the protocol, as will utility functions if required, they will need to be justified, and they will not be able to be changed. In my mind it is unlikely that undocumented, subjective priors will be allowed.

3. Conservatism

Pharmaceutical companies tend to be conservative as far as statistics are concerned. The argument is often made that we do not need new methods because we have successfully registered drugs with the existing methods. That is true, but it does not preclude the development of alternative, more efficient, methodology. As statisticians we need to learn to sell technical advancement not solely to fellow statisticians but also to budget holders. The impact of statistics on the bottom line is a very convincing argument for changing methods!

4. Lack of Tools

Many statisticians will tell you that they would have used Bayesian methods had the necessary tools been available. They are now. The development over the last 10 years of Monte Carlo Markov Chain methods has made the use of Bayesian methods a practical proposition for the applied statistician.

These objections, although substantial, are not insurmountable. I believe that there is a good prospect that more statisticians in the pharmaceutical industry will in the future use Bayesian ideas. Their use may start in early phases of drug development where decision making tends to be internal to the company. But with familiarity their use will widen even if the prospect of a Bayesian 21st century, as predicted by Dennis Lindley, is not yet certain.

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On A Bayesian Subject Allocation Method in Clinical Trials

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1. Subject Allocation in Controlled Clinical Trials

Clinical trials are mandatory before a regulatory authority can approve use of a medicinal product. Before the start of any clinical trial, the trial protocol must be approved by an Institutional Review Board to ensure that the trial design is ethical and that the rights of all study subjects are secured. Specifically, all participating subjects must sign a proper informed consent form to ensure they are well aware of the study details and their rights to withdraw at any time without penalty.[1]

Since R.A. Fisher introduced the concept of randomization in 1926, randomized controlled trials (RCTs) have been recognized as the "gold standard" for the evaluation of treatment efficacy and safety by including active and placebo controls.[2] Randomisation is a vital element in design of experiments to minimise bias from uncontrolled systematic factors and to facilitate valid statistical inference. However, a common challenge to RCTs is the allocation of study subjects to a sub-optimal treatment (e.g., placebo/active control) although it is unclear which treatment will be optimal until all data are gathered and analysed. This leads to tension between individual ethical concerns to provide the best-known treatment for individual patients and collective ethical concerns to advance current knowledge for the benefit of future patients.[3,4]

A Bayesian approach for subject allocation to study treatments, termed the Kadane-Sedransk-Seidenfeld (KSS) method, has been previously proposed.[3] This aims to optimize the individual and collective ethics simultaneously. Before recruitment starts, a group of medical experts is formed and their opinions on the efficacy of the study treatments at different levels of certain prognostic factors are solicited. A statistical model, called Prior, is then developed to imitate the expert opinions. Given the prognoses of a newly recruited subject, predicted outcomes when the subject was assigned with different treatments are computed using the Prior model. The subject is then allocated accordingly to the "optimal" treatment with the best-predicted outcome. The expert Prior model is continually updated as more efficacy data are accrued through an automatic computer program. Periodic calibration of the Prior model may also be performed by further advice from the expert panel when presented with some hypothetical efficacy data.

In general, such a Bayesian allocation method is less appealing for trials that aim to study long-term efficacy, as most of the subjects are likely to be recruited and assigned a treatment before any efficacy data are accrued to update the Prior model. On the other hand, there may be over-emphasis on the veracity of the initial Prior model for trials that focus on short-term efficacy. This is because only a few elicitation exercises can be performed for calibration. In the following discussion, we will focus on situations where efficacy data are steadily accrued, with

sufficient calibration of the Prior model well before subject recruitment is completed.

2. The Use of Prior

Subjective bias introduced by the use of Prior has been a criticism of Bayesian methods. We discuss here a slight elaboration regarding the use of Prior for subject allocation.

Prior can be treated as an adaptive allocation device, governed by both soliciting expert opinions (qualitatively) and by accruing efficacy data with some hypothesized statistical assumptions (quantitatively). It aims to imitate expert opinion for the best current treatment to patients having different prognostic risks. The use of subject prognoses to decide an optimal treatment is attractive but debatable. Specifically, there might be an imbalance between treatment groups with respect to certain prognostic factors resulting from the Bayesian method. For instance, severely ill patients may tend to be assigned or not assigned to an investigating treatment by the experts. Some prognostic factors might thus be confounded with the treatment effect and thus the outcome is not collectively ethical.

In addition, the Prior model is updated in accordance with certain statistical distribution assumptions that are often hypothesized for the sake of mathematical convenience, and no justification can be made. To a certain extent, calibration by the expert panel can help to warrant the veracity of the continually updated Prior. Frequent calibration is, however, not feasible, as the resulting Prior relies too much on the medical judgement of the expert panel, with few statistically valid grounds for such decisions. Nevertheless, when there is a significant discrepancy between the updating process and reality, it will again be unethical on the collective level, though the outcome may not be too serious at the individual level when compared with standard randomization procedures.

Moreover, the Prior will be extremely biased when data are missing owing to inferiority of a particular study treatment when those recorded tend to be responsive to the treatment. The Prior will then continually assign subjects to that study treatment not because it is "optimal", but because its inferiority is not recognized.

3. Logistic Difficulty

To build up a good Prior, the expert panel should have a good span of knowledge and hold distinctive views in the area of the study treatment. However, when there is limited practical knowledge of the investigating treatment, gathering expert opinion may present great difficulty.[4]

In addition, clinical trials data are first recorded on case report forms (CRFs) by a study nurse at the study site. After certain data monitoring procedures, all data are entered twice independently into two separate databases that are compared and have all discrepancies removed before analysis is undertaken. Therefore, there will be a time lag before the efficacy data of a subject on the CRFs are transferred into a database and checked for data quality. By the time the Prior is updated, there may have been a number of additional subjects recruited who need to have their treatments decided, and more efficacy data accrued. The advance of electronic data capture technology might help to mitigate this issue, but further technological development is needed.

4. Conclusions

The motive of the Bayesian method that aims to assign the best treatment to patients by imitating expert opinion is no doubt superior. Only a few personal viewpoints are briefly outlined, while other issues such as how the sample size is computed would also be worth discussing. A broad conclusion is that reservations are yet to be resolved before the Bayesian method for subject allocation can be practically employed in most comparative trials. Randomized controlled trials remain the gold standard design for evaluation of treatment efficacy and safety, provided a proper monitoring system and good clinical practice (including proper administration of informed consent) is secured.

Acknowledgement

Financial support from the Committee on Research and Conference Grants is gratefully acknowledged.

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Bayesian vs.Frequentist

Tie-Hua Ng
U. S. Food and Drug Administration

Summary. A simple experiment of tossing a coin is used to illustrate the basic concept of Bayesian approach and highlight the basic differences between the Bayesian and the frequentist approaches.

Bayesian approach. Let's consider a parameter of interest, say, θ. The basic assumptions of the Bayesian approach are (1) θ is an unknown random variable, and (2) there is a prior distribution for θ. We then compute the posterior distribution of θ given the data as follow:

$$\Pr[\theta \mid \text{data}] \propto \Pr[\text{data} \mid \theta] \Pr[\theta].$$

$\Pr[\text{data}|\theta]$ is the distribution of the data given θ, and $\Pr[\theta]$ is the prior distribution of θ.

Coin Experiment. Let's consider a simple experiment of tossing a coin. The parameter of interest θ is the probability of a head. We say that it is a fair coin, if $\theta = 0.5$, and that it is an unfair coin, otherwise. Suppose that we make n tosses. Based on the outcomes of these n tosses, we are interested in answering the question "Is it an unfair coin?" This may be formulated, in the frequentist framework, as testing the null hypothesis that $\theta = 0.5$ against the alternative hypothesis that $\theta \neq 0.5$.

Prior Distribution. Suppose that there are 30 coins in the box --- 6 fair coins labeled as blue, 21 of the unfair coins labeled as red with θ=0.6 and 3 unfair coins labeled as green with θ=0.7. For a given coin, θ is an unknown constant. On the other hand, if the coin is selected at random so that each coin has an equal chance of being selected, then the parameter of interest, denoted by Θ, is a random variable with the following distribution.

$\Pr[\Theta = 0.5] = 0.2$,
$\Pr[\Theta = 0.6] = 0.7$,
$\Pr[\Theta = 0.7] = 0.1$.

This is known as the prior distribution of Θ.

Let's suppose that we select a coin at random from the box without knowing the color of the coin (so Θ is not observed). We then toss the coin 10 times and count number of heads. Let X be the number of heads. Then we have a bivariate distribution (Θ, X). Although Θ is fixed once a coin is selected, if we do not know its value, Θ can still be considered random because we know nothing more than what we already knew before the coin was selected.

Clearly, given $\Theta = \theta$, X follows a Binomial distribution with parameters (10, θ), as shown in Figure 1. If we multiply the distribution of X given Θ by the prior distribution, we get the joint distribution of Θ and X as given in Figure 2. Therefore, the prior distribution acts like weights. If we do not know the proportions of the three types of coins, then we do not know the priors. In that situation, non-informative priors are often used. That is we assume that there are 10 coins of each type. We see that a non-informative prior means equal weights and that it is the "best guess" of the prior distribution of Θ, if there is no prior data.

Posterior Distribution. The posterior distribution of Θ is the conditional distribution of Θ given X. It is computed by normalizing the joint distribution of Θ and X (Figure 2) for each X. In other words, for each column in Figure 2, divide the joint probabilities by the column sum. As an example, $\Pr[\Theta = 0.6 \mid X = 7]$ of 0.75 is computed by dividing 0.15 by 0.2 which is the column sum at X = 7. The posterior distribution of Θ is shown in Fig. 3.

Is it an unfair coin? Let's suppose that we observe X = 9, then the posterior probability of an unfair coin is 0.954 (see Figure 3) which highly indicates that it is an unfair coin. So, it is logical to conclude that it is an unfair coin. In that case, the error probability of concluding an unfair coin is 0.046. On the other hand, if we observe X = 3, then the posterior probability of an unfair coin is 0.564. If we conclude that it is an unfair coin, then the error probability of concluding an unfair coin is 0.434. Therefore, if we want to limit the error probability of concluding an unfair coin to 0.05, then we would conclude that it is an unfair coin if the posterior probability of an unfair coin given X exceeds 0.95. In that case, we would conclude that the coin is unfair, if X = 9 or 10.

Bayesian versus Frequentist. Frequentist approach is derived from the distribution under the null, that is $\Theta = 0.5$. At 0.05 significance level, we would conclude that the coin is unfair if X = 9 or 10 (see Figure 1). In this particular example, both approaches lead to the same conclusion, that is to conclude that the coin is unfair, if X = 9 or 10. This might not be the case in general.

The frequentist approach controls the error probability given that it is a fair coin ($\Theta = 0.5$) regardless of the prior distribution of Θ. In contrast, the Bayesian approach controls the error probability conditional on X, which depends on the prior distribution. Clearly, if we know the prior distribution, Bayesian approach has a big advantage over the frequentist approach. On the other hand, if we do not know the prior distribution and use a non-informative prior, depending upon the true prior and observed X, the error probability of concluding an unfair coin may not be controlled.

Reference

Ng, T-H. "Can Bayesian approaches be used in clinical trials?" Presented at PhRMA Workshop, Baltimore, MD, September 7-10, 1997, and ICSA Applied Statistics Symposium, June 18-20, 1999.

Figure 1. Distribution of X | Θ

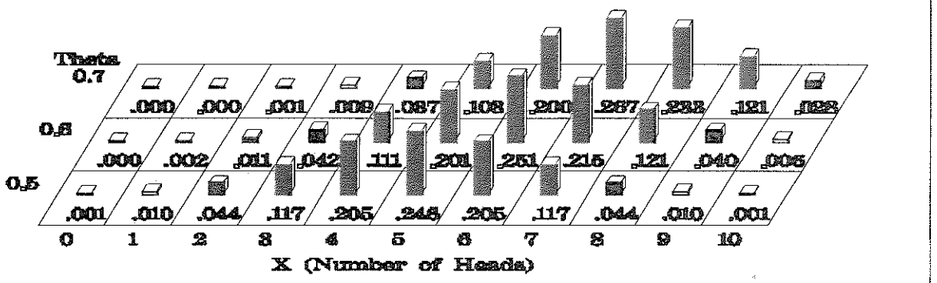


Figure 2. Joint Distribution of (Θ, X)
Priors: 0.2, 0.7, 0.1

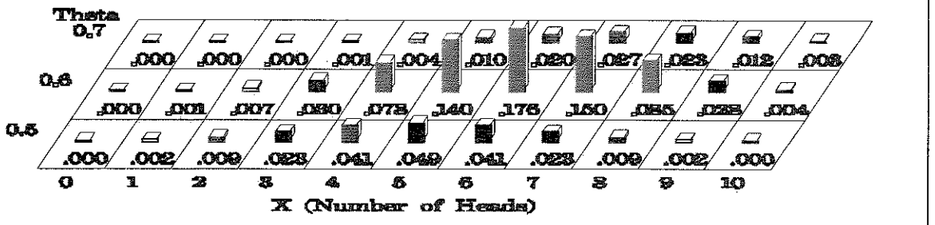
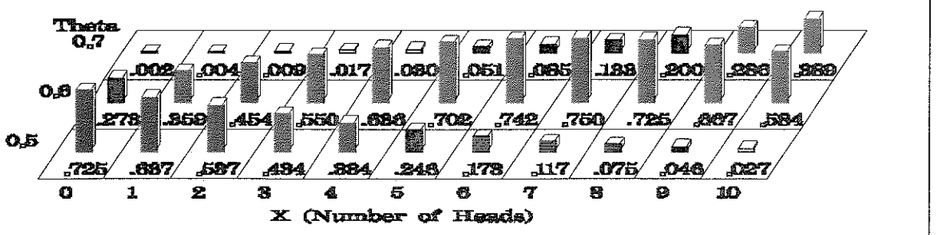


Figure 3. Distribution of Θ | X
Priors: 0.2, 0.7, 0.1



Bayesian Statistics in a Regulatory Environment

Gregory Campbell

Director, Division of Biostatistics
Center for Device and Radiological Health
U.S. Food and Drug Administration

The Center for Devices and Radiological Health (CDRH) in the U.S. Food and Drug Administration (FDA) has recently embarked on an initiative to investigate how Bayesian design and analysis can be used effectively by medical device companies in their pre-market submissions to CDRH.

While Bayesian statistics has been around for quite a while, a natural question is why would CDRH embark on this path at this time. Prior information plays a key role in the regulation of medical devices. In contrast to pharmaceutical products, the mechanism of action of many devices is physical as opposed to pharmacokinetic, local as opposed to systemic. There is often an abundance of information for the same device or a very similar one. This is so because the nature of medical device development is a series of (often gradual) changes in the design and construction. Further, there are sometimes data on trials conducted abroad or from pilots and data registries. If the control is also a device, its performance may be already very well characterized. The remarkable change in the past few years in Bayesian statistics, a change that has catapulted the subject from the mathematical treatment of idealized conjugate priors to very realistic modeling, has been the arrival of fast computation combined with clever algorithms for Bayesian calculations. This advance now allows one to compute the posterior distribution (and any function thereof) for virtually any prior distribution.

In 1997 CDRH launched an effort to investigate whether the application of this methodology would be of use in the pre-market review of applications by medical device companies to the FDA. To this end CDRH enlisted the help of a Bayesian expert (D. Malec) for a period of over a year to explore the various issues that might arise in the use of Bayesian statistics in a regulatory environment. More recently, the Division of Biostatistics has hired two statisticians who are well-trained in Bayesian methods. In November, 1998, CDRH held a workshop (jointly sponsored by the Health Industry Manufacturers Association) that was attended by over 200 participants and very well-received. It featured presentations by FDA personnel, by academicians including D. Berry, W. Strawderman, and M. Escobar, and real case studies by representatives of four device manufacturers.

In the past year there have been two Pre-Market Approval applications (PMAs) that have been approved by the FDA with Bayesian analysis. A description of the analysis for these is in their Summaries of Safety and Effectiveness at the FDA website (www.fda.gov/cdrh/pdf/p970015b.pdf, www.fda.gov/cdrh/pdf/p970033b.pdf).

The philosophical underpinning for the success of this effort among the medical device community is that there needs to be an obvious potential benefit for the manufacturer for undertaking a clinical trial that is designed and analyzed with Bayesian methodology. One obvious area is in the use of valid scientific evidence outside the scope of the current trial. In contrast to the traditional frequentist trial, wherein one allows no formal incorporation of any prior information whatsoever, there is often good quantitative prior data for device studies that could be utilized. If such prior quantitative data were predictive of the current trial, it could help to short-circuit any argument about the validity of the prior and its use could dramatically reduce the size of the current study. For example, in a hierarchical modeling situation, the question for prior quantitative data sources is whether the studies are what is called exchangeable with each other and with the current trial. (This is to be distinguished from exchangeability of subjects across trials.) This determination is not merely a statistical one but requires clinical expertise as well. Is it the same or a very similar device? Is the patient population and the inclusion /exclusion criteria the same or very close?

Other ways in which Bayesian trials can differ are as follows: 1) The rule to declare success for a clinical trial can be very different in a Bayesian study. Rather than rely on the size of some P-value that measures how deviant the results are under the null hypothesis, the decision for the Bayesian trial would be based on the posterior distribution in some fashion. 2) Bayesian predictive methods can be helpful in assessing the validity of a surrogate endpoint or in monitoring an on-going trial. 3) Trials for ethically sensitive devices can be designed (and analyzed) that allow for adaptive assignment of treatments to patients. 4) Bayesian methods can be employed to impute missing data.

An underlying philosophy is that there is no one unique methodology (be it frequentist or Bayesian) for a particular device to plan to show it safe and effective. It is up to the company to propose the design of the trial and its planned analysis and then meet with the FDA for a discussion of it. Medical device companies are encouraged to meet early with CDRH representatives to discuss the proposed design and analysis; for Bayesian trials, this is especially important.

Many interesting research questions have arisen in this effort to investigate the use of Bayesian statistics in the regulatory environment. For example, what is the Bayesian analog of Type I error that protects the American public from devices that are unsafe or ineffective? What is a realistic way to anticipate an expected sample size for a Bayesian trial? What are the implications of the Likelihood Principle? What are frequentist properties of Bayesian stopping rules? How sensitive are hierarchical Bayesian analyses to non-informative priors on hyperparameters (parameters of the prior distribution), especially when there is only a single previous quantitative data set? How informative is the *de facto* prior that is generated from a hierarchical model on multiple previous data sets, when non-informative priors are assumed for hyperparameters? Other interesting questions relate to Bayesian subgroup analysis and to the implementation of a decision analysis approach.

Statisticians who are thinking about future training for applied work should give serious consideration to becoming familiar with Bayesian methodology. It is expected that this methodology will continue to play an ever increasingly important role in applied statistics in general and in the regulation of medical devices in the U.S. in particular.

ICSA 2000 Annual Membership Meeting And Dinner Party

Member meeting

Time: 6pm, Wednesday, August 16, 2000
Location: Please refer to the ASA JSM program

Dinner (Buffet) Party

Time: 7pm, Wednesday, August 16, 2000
Location: Thai Garden Restaurant, 245 S. Meridian St., Indianapolis, IN 46225
(within walking distance from the Convention Center and the RCA Dome)
Costs: Adults: $18 (soft drinks and tips included)
Children ages 3-12: $6
Children under 3: free
(Tickets can be purchased at the ICSA booth during the JSM)

Menu Highlights:

Roasted Duck
Snow Crab Legs
Gai Yaang – Rotisserie Chicken
Shrimp with Pea Pods
Pa Padd Prik Khing – Fried catfish with banana peppers, red peppers, and Thai basil
Padd Hoy – Stir fried mussels
Padd Gra Paow – Chicken, banana peppers and Thai Basil
Thai chicken wings
Padd Thai
Padd Seuw (Vegetarian)
Padd Tahu – Stir fried vegetable and fried tofu
Thom Yum Talay – Sour soup with blue crab prawn, shrimp, mussels, and calamari
Yum Woon Sen – Chicken bean thread noodle salad
Thai Salad
Kao Padd – fried rice
Spring Rolls
Fruit cocktail
Fresh fruit
Almond cookies
Thai Tapioca Pudding

Entertainment: Karaoke (please bring your own laserdiscs)

Contact: Ouhong Wang: wang_ouhong@lilly.com or (317)277-3953

❖ ANNOUNCEMENT ❖

ICSA 2001 APPLIED STATISTICS SYMPOSIUM
June 8-10, 2001
Congress Hotel, Chicago, Illinois

For the first time in the history of ICSA, the 11th annual ICSA symposium will be held at Chicago. Chicago is the center of finance and industries in the mid-west area. It is the home of several fine academic institutions. The city is also known for its architectural beauty.

The theme of the 2001 Symposium is Bioinformatics and Data Mining. All interested are invited to attend.

For information about the 2001 Symposium, please go to http://www.icsa.com.

DATE: June 8 to 10, 2001, short courses on June 8, Friday and sessions on Saturday and Sunday

LOCATION: Congress Hotel, at Grant Park in Chicago. The hotel is a landmark in downtown Chicago near Lake Michigan.

ACCOMODATION: $115 single and $125 double at Congress Hotel. Information about dormitories will be available at a latter date.

BANQUET: Will be held at a restaurant in the Chinatown in Chicago.

LOCAL ATTRACTIONS: Many attractions are within walking distance of the Congress Hotel; Chinatown, Water Tower and Navy pier are a short bus- or taxi-ride away. Boat tours are available at the pier; More tourist information will be available at a latter date.

STUDENT AWARD: Students may submit research articles to the Program Committee. A cash award will be offered as an assistance to the student's travel funding to attend ICSA symposium. Up to four awards at $350 each will be available. See announcement in this bulletin for details.

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Andrew Xiao-Hua Zhou, Indiana University Medical Center

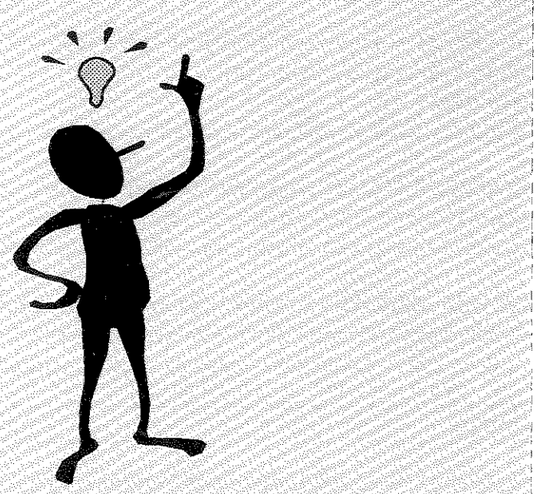
CALL FOR PAPERS

ICSA 2001 Applied Statistics Symposium
June 8-10, 2001

The Program Committee of the ICSA 2001 Applied Statistics Symposium invites you to submit statistical papers for presentation at the Symposium. Abstracts for invited and contributed papers are due **March 30, 2001**.

Please submit abstracts to the following Program Committee members:

Jianqing Fan, e-mail address: jfan@math.ucla.edu
Jun Liu, e-mail address: jliu@stat.stanford.edu
Ruey Tsay, e-mail address: rst@gsbrst.uchicago.edu



The abstract should include the name, work affiliation, mailing address, telephone number, fax number, and e-mail address of the author, and should not exceed 200 words. Template of the abstract may be downloaded from ICSA web site http://www.icsa.org.

ICSA 2001 Applied Statistics Symposium
Student Awards and Travel Fellowships

The Program Committee of the 2001 ICSA Applied Statistics Symposium sponsors student awards and travel fellowships. The purpose of the award is to encourage ICSA student members to participate and present their research work at the annual meeting.

All ICSA members who are degree candidates in 2001 at accredited institutions and are able to present the manuscript at the 2001 Symposium are eligible to apply.

Award: Up to three (3) awards of $350 each are available.

Submission of application: The applicant will mail the following items:

1. Cover letter
2. 5 copies of the manuscript with no identification of the author
3. Title page with author's name, institution, mailing address, phone number, and e-mail address
4. Two copies of completed ICSA Applied Statistics abstract form
5. Two copies of ICSA membership application form, if the student is not a member.

to any one of the three members of the Program Committee:

Jianqing Fan, e-mail address: jfan@math.ucla.edu
Jun Liu, e-mail address: jliu@stat.stanford.edu
Ruey Tsay, e-mail address: rst@gsbrst.uchicago.edu

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The subject of the research must be relevant to application of statistics. The student author must be the primary author of the research presented in the manuscript.

The manuscript should be double-spaced using Biometrics or JASA guidelines for authors. The text of manuscript, excluding tables and figures, should not exceed 20 pages. Use one inch margins and no small than 12-point type.

Deadline: The manuscript must be postmarked no later than January 31, 2001.

Award announcement: The winners of the awards will be notified by March 15, 2001.

INTERNATIONAL CHINESE STATISTICAL ASSOCIATION

The 5th ICSA International Conference, Hong Kong, August 17-19, 2001

Date : August 17 – 19, 2001 (Prior to the 53rd Session of ISI in Seoul)

Place : The University of Hong Kong, Hong Kong

Keynote Speakers : Professors Peter Hall and Tze-Leung Lai

Registration Fee (Including Reception, Banquet, Coffee and two Lunches)

	On or before April 1, 2001	*After April 1, 2001*
Regular	U.S. $150	U.S. $200
Student (need proof from the university)	U.S. $120	U.S. $150

CALL for PAPERS

Papers, both theoretical and applied, are invited for presentation at the conference. Please send a copy of the abstract of no more than 200 words (without any symbols or formulas) to the following address (preferably by e-mail or on disk) before April 1, 2001 along with your registration form and fee. A sample abstract can be found in the website of the conference:

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The 5th ICSA International Conference, Hong Kong, August 17-19, 2001

Registration Form

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STATISTICS' DELIGHT

統 計 趣 聞

統計謎語

- 如果統計是從有限的資料、線索尋找答案的一門學問，則謎語也可以看做是統計問題。以下的是筆者在大學部BBS上讀到的謎語，大約不是一般「古典統計」所能輕易破解的。

根據以下的提示，各射成語一句。
1.數字" 3"
在路上走呀走...翻了一個跟斗..又接著翻了一個...
2.一條狗過了獨木橋之後就不叫了
3.第十一本書
4.一隻蜜蜂停在日曆上
5.牛狗豬羊比賽賽跑...跑到終點後...牛狗豬都喘得不得了...只有羊不喘氣
6.用豬肝和熊膽作成的神奇肥皂

答案

1.三番兩次
2.過目不忘（過木不" メ丈\" ）
3.不可思議（Book 11）
4.風和日麗（蜂和日曆）
5.揚眉吐氣（羊沒吐氣）
6.肝膽相照（肝膽香皂）

Remembering Professor William G. Cochran

I teach at the University of Texas at Arlington that is about 30 minutes from Dallas. When my friends visit us and if they have not visited President John F. Kennedy's memorial, I usually take them to downtown Dallas where the memorial is. We also visit the Sixth Floor Museum at Dealey Plaza. It was on the sixth floor of the book depository that Lee Harvey Oswald fired the shot and assassinated President Kennedy on November 22, 1963. When you visit the Museum, one question people ask is "where were you when President Kennedy was assassinated?" I remember that I was in Professor William G. Cochran's statistics class. At 1 PM Central Standard Time (2 PM Eastern Time) on that day, the radio announced that President Kennedy was dead. One of my classmates came to Cochran's class and told everybody that Kennedy was assassinated. Professor Cochran said "Is that so?" and he continued his lecture. In the middle of the class, the bell at the Memorial Church in Harvard Yard started to ring. Professor Cochran continued his lecture until the end of the class. When we came out of our class, we saw that people were gathering in Harvard Yard to listen to the sad news. Professor Cochran realized that my classmate was not trying to skip his statistics class. Do you remember where were you that day?

Chien-Pai Han

Frequentist to Bayesian

♬

It gives an ambiguous answer to a right question

♬

♬♬♬

Bayesian in the night,
wondering in the darkness
.....

♬♬♬♬

Professor R.V. Hogg sang "stranger in the night tune" at the Munci Meeting in 1998

Bayesian to Frequentist

♬

It gives a very precise answer to a wrong question

♬

From the Desk of the Editorial Working Committee

Congratulations to the Following ICSA Members Who Were Elected as ASA and IMS Fellows in 1999

ASA Fellows:

Ching-Shui Cheng, Professor, Department of Statistics, University of California, Berkeley: For innovative and path-breaking research in optimal design; and for outstanding editorial service to the profession.

Jianqing Fan, Professor, Department of Statistics, University of California, Los Angeles: For outstanding contributions to statistical theory and methodology, especially in minimax theory, deconvolution, and nonparametric modeling; and for perceptive and conscientious editorial service.

Mei-Ling Ting Lee, Assistant Professor, Harvard Medical School, Harvard University: For influential contributions in statistical applications in microbiology and medical research; for pioneering editorial work; for contributions to the theory and application of association of multivariate distributions; and for service to the profession.

Jun Shao, Professor, Department of Statistics, University of Wisconsin, Madison: For fundamental contributions to resampling methods, inference in sample surveys, model selection, asymptotic theory, and medical statistics; and for dedication to editorial service.

Wing Hung Wong, Professor, Department of Statistics, Univeristy of California, Los Angeles: For original and fundamental contributions to the theroy of partial likelihood, data augmentation, and image reconstruction; and for the aplication of statistics to molecular biology.

Mark C.K. Yang, Profesor, Univeristy of Florida: For innovative research in sequential analysis, extreme value theory, and probability inequalities; for original methodological research in the aplication of statistics in dentistry, and for excellent collaborating research in Electroenechalograph data analysis.

Zhiliang Ying, Professor, Department of Statistics, Rutgers University: For outstanding contributions to development of new statistical theory and methdology especially in survival analysis, non- and semiparametric models, and computerized testing; and for superb editorial service.

IMS Fellows:

Danyu Lin, University of Washington For significant contributions to survival analysis, design and analysis of clinical trials, and epidemiological methods; and for editorial and other services to the profession.

Bin Yu, Bell Labs For important wide-ranging research contributions in empirical processes, information theory, genetics, Markov chain Monte carlo, data compression, and density estimation.

SELECTED PAPERS FROM THE 1999 APPLIED STATISTICAL SYMPOSIUM OF THE INTERNATIONAL CHINESE STATISTICAL ASSOCIATION

Organizing Editors

Chien-Pai Han
Department of Mathematics
University of Texas—Arlington
Arlington, TX 76019-0408

and

William W. S. Wei
Department of Statistics
Temple University
Philadelphia, PA 19122

Editor-in-Chief

William B. Smith
Department of Statistics
Texas A&M University
College Station, TX 77843-3143

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COMMUNICATIONS IN STATISTICS
Theory and Methods

Volume 29, Numbers 5 & 6, 2000

Selected Papers from the 1999 Applied Statistical Symposium of the International Chinese Statistical Association

CONTENTS

COMMUN. STATIST.—THEORY METH., 29(5&6), xi (2000)

Preface

The International Chinese Statistical Association (ICSA) held its annual Applied Statistics Symposium at Georgetown University, Washington, D.C., June 18 – 20, 1999. Professor Chin Long Chiang of the University of California at Berkeley gave the Keynote Address on "My Life as a Statistician". It is hoped that his speech published in this issue will inspire many young people. After his talk, 112 papers were delivered in invited and contributed sessions. The papers in this Special Issue are selected from the papers presented in the Symposium.

An earlier Special Issue in this journal (*Communications in Statistics – Theory and Methods*, Volume 27, Number 6, 1998) was published to celebrate the tenth anniversary of ICSA. The Association has been growing constantly which is reflected by the growing number of participants in the Applied Statistics Symposium. These participants come from Canada, China, Hong Kong, Singapore, Taiwan, United Kingdom, United States and other countries. As the Symposium has become larger, the Special Issue has also doubled its size from one regular issue to two issues (bound as one). On behalf of the International Chinese Statistical Association, the Guest Editors would like to express their appreciation to the Editor-In-Chief, Professor William B. Smith, for his effort in making this Special Issue possible.

The Guest Editors would like to thank the participants of the Applied Statistics Symposium, and, in particular, the authors of this Special Issue. Their patience and understanding are greatly acknowledged. We also would like to express our gratitude to the anonymous referees whose prompt and unselfish services are invaluable to the statistics community.

Chien-Pai Han
William W. S. Wei

COMMUN. STATIST.—THEORY METH., 29(5&6), xiii (2000)

Referees for This Special Issue

James H. Albert
Paul S. Albert
Robert Ball
Sherryl A. Baker
George E. Bonney
Gregory Campbell
Charles W. Champ
Jiahua Chen
Pai-Lien Chen
T. Timothy Chen
Siu-Hung Cheung
Richard Cook
Debbie J. Dupuis
Randy Eubank
Robert V. Foutz
Fah Fatt Gan
Christian Hafner
Xuming He
James E. Herndon
James Hung
John Darshong Hwang
Choudur K. Lakshminarayan
Carl Lee
Zhaohai Li
Runze Li
Karl K.F. Lin
Mary Lindstrom
Jen-Pei Liu
Nicholas T. Longford
Andre Lucas
Richard W. Madsen
Clyde A. McGilchrist
Charles E. McCulloch
Dirk F. Moore
R. J. O'Hara-Hines
Harji Patel
Friedrich Pukelsheim
Mark Reckase
Weichung Joe Shih
Justine Shults
Bikas K. Sinha
Stefan Sperlich
Yoshio Takane
Ming Tan
Kao-Tai Tsai
Yi Tsong
Alan T. K. Wan
Xikui Wang
Rand R. Wilcox
Russell Wolfinger
Xiaonan Xue
Grace Yang
Heping Zhang
Qing Zhang
Hongyu Zhao
Jie Zheng

WELCOME NEW MEMBERS

We would like to welcome new members who joined between December 1999 and July 2000.

Chan, Ngai Hang
Cui, Hengjian
Geng, Zhi
Liu, Jun (from Rutgers University)
Shoung, Jyh-Ming
Tian, Xin
Wang, Jin Fang
Wang, Sheldon
Yang, Ying
Zhao, Jun
Chang, Yueh
Demirtas, Hakan
Guo, Wensheng
Tang, Boxin
Tsao, Chen-Hai
Wang, LiQun
Wang, Suojin
Yin, Hong
Chiu, Hsiaoting
Fang, Ji-Qian
Li, Yun
Liu, Tongwei
Tian, Guoliang
Wang, Hongwei
Wang, Mey
Yang, Hailiang
Zhang, Jinshang

DONATIONS

Between December 1999 and July 2000, we have received donations from:

Li, Gang Yeh, Arthur and Zhou, Julie

HELP LOCATE MEMBERS WITH ADDRESS CHANGED

We have the following members who paid their membership due up to 1998 or 1999, but their address changed and hence we can not contact them. Please help us locate these members, if you happen to know him/her.

Chao, Chang-Tai
Duan, Naihua
Li, Kate
Qu, Roger Peng
Wang, Nae-Yuh
Chen, Lin
Guo, Chuanfa
Lin, Su-An
Teng, Chi-Hse
Wu, Changbao
Dong, Liming
Kung, Terry
Lu, Lisa
Tao, Aiyang
Yu, Yu
Du, YunLing
Leu, Cheng-Shiun
Qian, Chunlin
Wang, Finfang

MEMBER'S NEWS

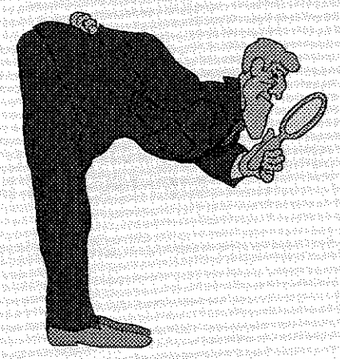
After recruiting 2 new members last year and 3 additional ones this year, as of July 1, 2000 the Department of Statistics at the University of Manitoba, Winnipeg, Manitoba Canada will have 5 Chinese professors on staff (out of 12). They are Gemai Chen, Smiley Cheng, James Fu, Liqun Wang and Xikui Wang. The Department is expecting to fill 2 more vacancies in the coming year. After a year of administrative leave, Smiley Cheng will start his second term of headship on July 1, 2000.

ICSA EXECUTIVE DIRECTOR (2001 – 2003)

The ICSA is soliciting enthusiastic and responsible candidates for the position of the Executive Director (ED) for 2000-2002. This is a 3-year non-remunerative job. The ED is responsible for administrative operations: maintain the ICSA member database, and supervise membership renewal process. The ED oversees election operations, organizes annual meetings and board of director meetings, provides assistance to biometrics section, and prepares materials for ICSA Bulletin and triannual directory.

The ED works closely with the president, committee chairs and the treasurer. A part-time Clerk is available to assist. Candidates should have at least 2 years of working experience and the ICSA membership is required. Proficiency in Mac computer is desirable but not essential.

If you would like to volunteer yourself or would like to recommend suitable ICSA members for this position, please contact Dr. Agnes C. Hsiung, Division of Biostatistics, National Health Research Institutes, 128 Yen-Chiu-Yuan Road, Section 2, Taipei 11529, Taiwan, R.O.C. Email address: hsiung@nhri.org.tw.



International Chinese Statistical Association

Profit and Loss

January through December 1999

	Jan - Dec '99	
Ordinary Income/Expense		
Income		
Advertisement		360.00
Contributions Income		
Unrestricted	1,155.00	
Total Contributions Income		1,155.00
Membership Dues		24,089.30
Miscellaneous Income		100.00
Reimbursed Expenses		
Banquet Fee Collected	3,005.00	
Total Reimbursed Expenses		3,005.00
Total Income		28,709.30
Expense		
Board Meeting		300.00
Casual Labor		378.00
Contributions		
ASA	500.00	
Total Contributions		500.00
ICSA at ASA meeting		
Banquet	3,728.46	
Board meeting	299.88	
Total ICSA at ASA meeting		4,028.34
Licenses and Permits		174.00
Postage and Delivery		
Ballot	855.65	
Jan. Bulletin	2,151.40	
Jul. Bulletin	1,713.62	
Renewal Notice	364.68	
Total Postage and Delivery		5,085.35
Printing and Reproduction		
Jan. Bulletin	2,420.00	
Jul. Bulletin	2,170.00	
Total Printing and Reproduction		4,590.00
Professional Fees		
Database design	4,000.00	
Total Professional Fees		4,000.00
Supplies		
Office	344.93	
Total Supplies		344.93
Web Page Hosting		345.00
Total Expense		19,745.62
Net Ordinary Income		8,963.68
Other Income/Expense		
Other Income		
Interest Income		3,548.05
Total Other Income		3,548.05
Net Other Income		3,548.05
Net Income		12,511.73

International Chinese Statistical Association

Profit and Loss

January through June 2000

Prepared by Xiu (Sue) Chen

	Jan - Jun '00
Ordinary Income/Expense	
Income	
Advertisement	1,570.00
Contributions Income	
Unrestricted	590.00
Total Contributions Income	590.00
Membership Dues	7,290.00
Total Income	9,450.00
Expense	
Casual Labor	224.00
Contributions	
ASA	500.00
Statistica Sinica	4,372.85
Total Contributions	4,872.85
Licenses and Permits	20.00
Office Supplies	15.86
Postage and Delivery	
Announcement	521.34
Ballot	515.91
Directory	4,225.98
Total Postage and Delivery	5,263.23
Printing and Reproduction	
Directory	3,688.00
Jan. Bulletin	2,588.75
Total Printing and Reproduction	6,276.75
Professional Fees	
Database design	1,000.00
Total Professional Fees	1,000.00
Web Page Hosting	79.55
Total Expense	17,752.24
Net Ordinary Income	-8,302.24
Other Income/Expense	
Other Income	
Interest Income	2,007.71
Total Other Income	2,007.71
Net Other Income	2,007.71
Net Income	-6,294.53

International Chinese Statistical Association

Balance Sheet

As of December 31, 1999

Prepared by Xiu (Sue) Chen

	Dec 31, '99
ASSETS	
Current Assets	
Checking/Savings	
6 Month CD	25,000.00
Checking	3,616.81
Saving	60,777.82
Total Checking/Savings	89,394.63
Total Current Assets	89,394.63
TOTAL ASSETS	89,394.63
LIABILITIES & EQUITY	
Equity	
Retained Earnings	76,882.90
Net Income	12,511.73
Total Equity	89,394.63
TOTAL LIABILITIES & EQUITY	89,394.63

Balance Sheet

As of June 30, 2000

	Jun 30, '00
ASSETS	
Current Assets	
Checking/Savings	
6 Month CD	25,000.00
Checking	1,879.39
Saving	56,220.71
Total Checking/Savings	83,100.10
Total Current Assets	83,100.10
TOTAL ASSETS	83,100.10
LIABILITIES & EQUITY	
Equity	
Retained Earnings	89,394.63
Net Income	-6,294.53
Total Equity	83,100.10
TOTAL LIABILITIES & EQUITY	83,100.10

INTERNATIONAL CHINESE STATISTICAL ASSOCIATION

Membership Application / Renewal Form (2000)

Date _____

NAME (Last) (First)

English:

Chinese:

ADDRESS

Office:	Home:
City: State:	City:
State:	
Zip:	Zip:
Country:	Country:
Tel (O):	Tel (H):
Fax (O):	Fax (H):

E-Mail Address:

Highest Degree: Year Graduated:

University: Occupation/Title:

MEMBERSHIP FEES

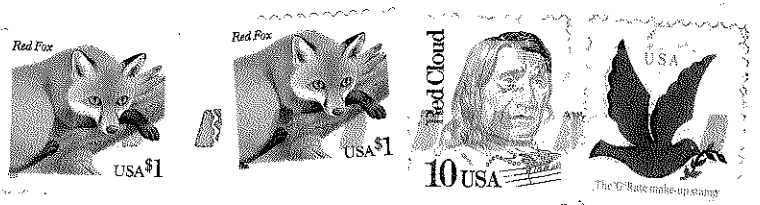
Regular	US$40	_____
Student	US$20	_____
Permanent	US$400	_____
Spouse	(50%)	_____
Biometrics	(Free)	_____
Donations		_____
Total Amount		_____

(Spouse Name _____)

STATISTICAL AREA OF INTEREST (circle as many as you like):

A. Agriculture
B. Business/Econometrics
C. Computing/Graphics
D. Education
E. Engineering
F. Health Sciences
G. Probability
H. Social Sciences
I. Theory And Methods
N. Biostatistics

Please make checks payable to I.C.S.A.
Mail this form and a check to: **ICSA c/o Naitee Ting, Ph.D.**
198 Spicer Hill
Ledyard, CT 06339-1534
U.S.A.
(tingn@pfizer.com)



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198 Spicer Hill
Ledyard, CT 06339-1534
U.S.A.

AUG 9 2000 PM

SUBURBAN

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TOWNSHIP LINE ROAD
BLUE BELL PA 19422
United States