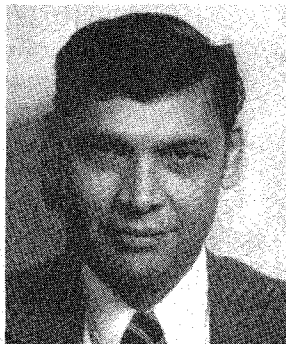


The Challenger Tragedy — What We Learned

Perhaps the most important event in shaping public policy on space exploration was the Challenger disaster. The Rogers Commission report on the space shuttle accident concluded it was caused by a combustion gas leak through a joint in one of the booster rockets, which was sealed by a device called an O-ring. The reports further concluded that O-rings do not seal properly at low temperatures.

Our March luncheon speaker, Dr. Siddhartha Dalal, was a member of the team of statisticians and analysts that evaluated the causes of the Challenger tragedy for the National Research Council. He will review some of the work he did on Challenger using risk analysis. Dr. Dalal will assess the need, relevance, and scope of risk analysis in general and in the space program in particular. Finally, using the Challenger accident as a case study, he will examine the general question of how statistical science fits into the risk assessment process.



The luncheon will be held on Tuesday, March 12, 1991 at the Midland Hotel, 172 W. Adams at LaSalle in downtown Chicago. Registration will start at 11:45 a.m. and lunch will be served, starting at noon.

Dr. Dalal is District Manager, Statistics and Econometrics Research Group, at Bellcore in Morristown, New Jersey. He started his career in telecommunications at Bell Laboratories in Murray Hill, New Jersey, and has been at Bellcore since its inception in 1984. Prior to his work at Bell Laboratories, Dr. Dalal taught statistics at Rutgers University.

On behalf of the National Research Council, he made significant contributions in the analysis of the space shuttle Challenger disaster. For this work, Dr. Dalal won the ASA Outstanding Statistical Application Award in the Field of Statistics last August. Last year he also became an ASA Fellow.

Dr. Dalal has published extensively in statistics in JASA, Management Science, and in marketing and software engineering journals. He earned his MBA in

marketing and his Ph.D. in Statistics from the University of Rochester. Dr. Dalal's current interests focus on improvement of the quality and reliability of large software systems, and in innovation diffusion models for new products and services.

Please join us in sharing the wit and wisdom of Sid Dalal. To make reservations, call Sheila Proietti, (312) 727-4373, or Kenneth Wollenberg, (312) 727-7575, by noon, Friday, March 8, 1991. The cost is \$20 for members and \$22 for non-members. If you make reservations and then are unable to attend, please let Kenneth know, since the Chapter must pay for luncheons prepared for no-shows.

As usual, the Chapter's Lucile Derrick Fund will purchase a limited number of luncheon tickets for students who wish to attend.

ASA School Team Competitions

1991 Quality and Productivity Scholastic Prizes

Sponsored by the Section on Quality and Productivity and the Center for Statistical Education of the American Statistical Association, these prizes are designed to focus efforts on the improvement of quantitative literacy and statistical thinking in American education; to highlight the need in American industry for a statistically knowledgeable workforce; to enhance education-industry exchange; and to foster stimulating and worthwhile educational projects involving statistics and business. Entries from high schools and middle/junior high schools must be postmarked by April 15, 1991. For additional information and entry form, contact Q&P Scholastic Prizes at the address below.

American Statistics Poster Competition

Sponsored by the Section on Statistical Graphics and the Center for Statistical Education of the ASA, the Statistics Poster Competition offers a means of encouraging students to discover the usefulness of displaying data from their everyday lives, an opportunity to discover new graphical techniques, and a challenge to use their creative skills to manifest the maxim that "a picture is worth a thousand words." In today's

(Continued on Page 2)

Differing Opinions

Last month we ran a puzzle contributed by Ken Wollenberg and attributed to Marilyn vos Savant. We've received two differing answers.

The puzzle: Suppose you're on a game show and are given a choice of three doors. Behind one is a car; behind the others are goats. You pick Door No. 1, and the host, who knows what's behind them, opens Door No. 3, which has a goat. He then asks if you want to pick Door No. 2. Should you switch?

In her column "Ask Marilyn," Marilyn vos Savant responded as follows: "Yes. The first door has a 1/3 chance of winning, but the second has a 2/3 chance."

Here are the answers we received:

By now, as you all know, Marilyn vos Savant was correct in her "switch" strategy for the game show problem described in the February *Parameter*.

The key to the problem lies in the fact that the game show host knows what's behind each door and will not spoil the game by revealing the car. To illustrate, say you always choose Door No. 1. The car is behind the circled door. The value of a goat is zero, while the value of the car is one.

DOORS	PROBABILITY	HOST OPENS DOOR	VALUE IF YOU SWITCH	EXPECTED VALUE OF DECISION
① 2 3	1/3	2 or 3	0	0
1 ② 3	1/3	3	1	1/3
1 2 ③	1/3	2	1	1/3
TOTAL EXPECTED VALUE OF THE DECISION TO SWITCH: 2/3				

For those of your friends who may still be skeptical as you walk them through it, try the following example (same principle):

What if there are 100 doors. Behind one is a car and behind each of the others are goats. You choose a door. The host, who knows where the car is, starts opening doors and releasing goats until the only two doors remaining are the one you chose originally and one other.

Since the probability of you choosing the door covering the car was 1/100 originally and the probability that the car was behind one of the remaining 99 doors was 99/100, nothing has occurred to alter those probabilities. All that the host has done by selectively opening 98 doors hiding the goats is to reduce the game to a simple decision. Do you want to keep the door you chose originally, that has a probability of 1/100 of having a car behind it, or do you want to switch to the door which, through the process of elimination, has a probability of 99/100 of having a car behind it?

It was interesting to note that Ms. vos Savant's critics were mathematicians, not statisticians. Is there a message there?

Ken Wollenberg

The problem posed in the *Parameter* is a classic example of "Type III error" — asking the wrong question! Ms. vos Savant's answer was correct, but for a different question. This problem originally surfaced about two years ago as the weekly "Puzzler" on

National Public Radio's "Car Talk." On the show "Let's Make a Deal," contestants were asked to choose between Doors No. 1, 2 and 3. Behind one of the doors is a goat, behind another is the grand prize (a new station wagon), and behind the third is a consolation prize (a new sofa). Monty reveals what is behind one of the doors (not the one you chose) and then asks if you want to switch. The trick comes in the fact that Monty's first choice in revealing a door is to reveal the consolation prize, and his second choice is to reveal the goat. There are three possible scenarios:

1. You picked the goat — Monty reveals the sofa.
2. You picked the car — Monty reveals the sofa.
3. You picked the sofa — Monty reveals the goat.

If Monty reveals the goat, you should *switch* because you must be in scenario 3 — you originally picked the sofa! It doesn't matter what you do if he reveals the sofa, because you can't tell if you are in scenario 1 or 2. You can switch, or not switch. This means that *always* switching is one of the optimal strategies, and is better than the "never switching" strategy. The probability of winning the car using one of the optimal strategies is 2/3, Ms. vos Savant's answer. The "Car Talk" hosts got most of this answer correct. They did not mention that there is more than one optimal decision rule. But then, they're only engineers, not statisticians.

This example reinforces a lesson many of us have seen far too often: Be sure you understand the question before you give the answer!

Sue Groshong

ASA School Team Competitions

(Continued from Page 1)

information-based society, appreciation of graphical displays of data is a critical skill that should become a part of every student's education. The Poster Competition is a rewarding and fun way to emphasize graphing skills. Entries from grades K-12 must be postmarked by May 15, 1991. For additional information and entry form, contact Poster Competition at the address below.

Fifth Annual American Statistics Project Competition

Sponsored by the Center for Statistical Education of the ASA, with support from the Exxon Education Foundation, this competition offers an opportunity for students to work together as a team to discover the scope and applicability of techniques in statistics; to apply these techniques in what might be unfamiliar context; and to develop a critical appreciation of the logical progression from research questions to research conclusions. Entries from grades 4-12 must be postmarked by May 15, 1991. For additional information and entry form, contact Project Competition at the address below:

Center for Statistical Education
American Statistical Association
1425 Duke St., Alexandria, VA 22314-3402
(703) 684-1221

Chicago ASA Help Line

The following Chicago Chapter ASA members have volunteered to answer your statistical software-related questions. Volunteers should be expected to answer only questions relating to *statistical software* and not questions relating to statistical procedures and their use in data analysis.

Don't be shy about using this valuable resource; it's one of the best services that the Chicago ASA provides to the Chicago statistical community. But, please use this service wisely. Treat these volunteers as you would like to be treated yourself. Before you call them, try to isolate your problem as best you can and check your documentation. (Don't expect any help if your software is an illegal copy and you have no documentation!) Remember, also, that some of the software vendors have their own help lines, so they should be availed of before calling on our volunteers. Try not to take up more than a few minutes of a volunteer's time. Don't expect answers which require a lot of time to provide, or specific answers to matters involving complex issues.

The Help Line is not intended to provide volunteers to give advice on issues that would otherwise entail the engagement of a paid consultant. You should be aware, though, that some of these volunteers are consultants in their area of expertise and that their voluntary help may evolve into a consulting engagement.

That this is a Chicago ASA service in no way implies that the Chapter warrants the service offered. Chicago ASA has not checked the volunteers to see if they really do know their stuff, so you're on your own with any advice received.

Help Line Volunteers:

1. Statistical Packages

BMDP

Minu Patel

M-F	4:00 p.m. — 5:00 p.m.	312-996-7600
	(will return calls)	

DataDesk 3.0

Eric Ziemer

M-F	9:00 a.m. — 4:30 p.m.	312-727-3951
M-F	6:30 p.m. — 10:00 p.m.	312-728-0258

Minitab

Don Porter

TuTh	5:30 p.m. — 7:00 p.m.	708-980-9318 708-980-6682
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NCSS (most options)

Jerry Enenstein

M-Sa	9:00 a.m. — 10:00 p.m.	708-475-4403
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RS/Explore & RS/Discover

Don Porter

TuTh	5:30 p.m. — 7:00 p.m.	708-980-9318 708-980-6682
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SAS

Gerry Keith

M-F	8:00 a.m. — 5:00 p.m.	312-727-2506
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Pete McGuire

M-F	3:00 p.m. — 4:00 p.m.	708-291-5232
MWTh	6:00 p.m. — 7:00 p.m.	708-392-5496

Don Porter

TuTh	5:30 p.m. — 7:00 p.m.	708-980-9318 708-980-6682
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SPSS

Jerry Enenstein

M-Sa	9:00 a.m. — 10:00 p.m.	708-475-4403
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Jim Kennedy

MWF	9:00 a.m. — 5:00 p.m.	708-441-9474
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STATGRAPHICS

Don Porter

TuTh	5:30 p.m. — 7:00 p.m.	708-980-9318 708-980-6682
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STATISTIX

Jerry Enenstein

M-Sa	9:00 a.m. — 10:00 p.m.	708-475-4403
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2. Statistical Application Areas

No volunteers

3. Statistically Oriented Programming Languages

C-programming

Lazar Primack

M-F	9:00 a.m. — 5:00 p.m.	312-822-6387
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LAHEY FORTRAN

Jerry Enenstein

M-Sa	9:00 a.m. — 10:00 p.m.	708-475-4403
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4. Hardware/Operating Systems/Peripherals as they affect the use of statistical packages

Macintosh Computer Systems

Eric Ziemer

M-F	9:00 a.m. — 4:30 p.m.	312-727-3951
M-F	6:30 p.m. — 10:00 p.m.	312-728-0258

Ed Hirschland

M-F	8:00 a.m. — 6:00 p.m.	312-201-1111
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If you are interested in volunteering to answer questions in any Help Line category, write or call Help Line Editor Linda Clark at LMC Consulting Co., 1127 Dartmouth Rd., Flossmoor, IL 60422-1639; 708-798-0677.

Professional Development

The National Council on Measurement in Education is sponsoring training workshops in conjunction with their annual meeting this spring. Topics will include Hierarchical Linear Models, Use of the Mantel-Haenszel Measure of Differential Item Functioning, Validity and Reliability: An Introduction to Confirmatory Factor Analysis with LISREL, Computerized Adaptive Testing, and Introduction to Methods of Setting Standards. The workshop on hierarchical linear models will be held April 2-3 at the University of Chicago. Other workshops will be held at the Hyatt Regency Chicago on April 3. Registration fees range from \$35 to \$90. For more information, contact Carole Perlman at 535-4000.

Advertising in Parameter

The *Parameter* will publish employment ads free of charge for members. An ad can be from an employer seeking to fill a position, provided it is submitted by a member, or an ad can be placed seeking employment, provided it is on the behalf of a member.

Other ads seeking to sell products or services may be placed in *Parameter* at a charge. Contact the editor, Kathy Morrissey, at (708) 564-6380 for more information.

Editor: Kathy Morrissey (708) 564-6380

Parameter, the official newsletter of the Chicago Chapter of the American Statistical Association, is published 11 times per year as a service for its members. Materials for publication should be submitted to the editor at Household Bank — 2N, 2700 Sanders Rd., Prospect Heights, IL 60070. **Deadline for the April Parameter is March 18.**

Parameter offers a free placement service for ASA Chicago Chapter members. Job applicants should send a draft of their advertisement and a resume to the editor at the above address. Applicant names will remain confidential if requested.

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