Chance (Spring 1994)

Enhancing Statistical Performance

My friend Dan Druckman has come out with another report for the National Academy of Sciences that promises to change my life as a statistician. Readers of previous columns may remember my reviews of Dan's reports, on extra statistical perception (Druckman *et al.*, 1988) and statistical self-help (*et al.* and Druckman, 1991). The latest report is entitled *Learning, Remembering, Believing: Enhancing Human Performance* (Druckman *et bob.*, 1994).

From this report, you can discover how to learn statistics better. For example, I now know why I can never remember whether it's sums of squares or differences of squares. (Or maybe it just depends on whether you take logs.)

A chapter on situated learning shows that on-the-job training has advantages over classroom lectures. I always knew that. First, it's harder to fall asleep on the job. Second, the problems we were assigned in class were never relevant to careers we were going into. Since statistics had its roots in agriculture, in our experimental design course, we were assigned the classic problems of how to allocate fertilizers in an agricultural field experiment. Even today, I still remember the periodic table of manures. When I finished that course, I knew more about Shinola than statistics.

If you want your students to really learn statistics, you should get them to do so in situations that imitate real life on the job. For example, after they've submitted an assigned report, pretend to be their boss: give them the report back and tell them to change the figures to make the results look better.

The best training for future government statisticians to learn, for example, linear regression is to have them do it while a phone is ringing, people are hollering in the hall, and their computer crashes in the middle of a calculation. According to Druckman's report, however, a disadvantage of situated learning is that it may not work in other situations. So, for example, I can only do linear regressions when there are phones ringing, people hollering, and the computer failing. But, after all, when do they ever stop?

Pilots have excellent training because they learn in a flight simulator. What we need is a statistics simulator. A sort of interactive statistical Nintendo game, like *Super Martingale Brothers*. With it, you could improve your hand, eye, and p-value coordination.

The report has a chapter on the illusion of learning. That's where you think you know it but you really don't. I sent a copy to a boss I once had.

There's a chapter on thought suppression. I was especially interested in that one, because, some time ago, I read a horrible article in the *Annals of Statistics* that I haven't been able to get

out of my mind. Normally I don't have that problem. Reading the *Annals* is sort of like eating Chinese food. Two hours after you've read an article, you can't remember anything.

Another chapter is on altered states of consciousness. Hypnosis, for example, is shown to be quite good for pain reduction. I can attest to that. I go into a hypnotic trance during every ASA presidential address. Learning in one's sleep is another example discussed. I've also tried that. Once, I listened in my sleep to recorded lectures from a Census Bureau research conference. It wasn't worth losing sleep over. Transcendental Meditation (TM) is a big topic of the report. And I've used that too. During a lecture I was giving on multiple imputation methods for nonresponse, I went into a TM trance and told everyone that, if they searched really hard, they could find the missing data inside themselves.

You may remember that last year, a major experiment was conducted here in Washington under the leadership of the Maharishi International University in Fairfield, Iowa. (I note that Iowa has become a bastion of statistics, what with Iowa State University, the University of Iowa, and the Maharishi International University.) Thousands convened here for an experiment to test the effectiveness of TM in reducing crime. I had asked the leaders if, while they were at it, they could also get the Census Bureau to adjust their figures for the undercount. The experiment was not so successful. The only apparent effect the group had on crime was that the Census Bureau was found not guilty.

For me, the best chapter in Druckman's report is the one on shared mental models and how a group mentality develops. After reading it, I can understand what gives rise to cults, such as the Moonies, the Hare Krishnas, and the Bayesians.

I recommend *Learning, Remembering, Believing* to all my friends. Besides, Academy reports come with a guarantee. If you buy the report and don't learn a thing, I believe they'll refund your money, but I can't remember when the offer expires.

Additional Reading

Druckman, Daniel and Swets, John A., eds. (1988), *Enhancing Human Performance: Issues, Theories, and Techniques*, Washington, D.C.: National Academy Press. "Reviewed" in *Chance*, Vol. 4 (1991) No. 1, pp. 64 and 63.

Druckman, Daniel and Bjork, Robert A., eds. (1991), *In the Mind's Eye: Enhancing Human Performance*, Washington, D.C.: National Academy Press. "Reviewed" in *Chance*, Vol. 4 (1991), No. 4, pp. 60 and 56.

Druckman, Daniel and Bjork, Robert A., eds. (1994), *Learning, Remembering, Believing: Enhancing Human Performance*, Washington, D.C.: National Academy Press.