Comment

B. Efron

Five weeks into my first probability course, we proved that long-run frequencies converge to their probabilities. It was a surprisingly difficult fact to prove considering that this was the definition of probability we started out with in the first week. Professor Shafer elegantly explores the historical roots of this confusion and draws some interesting conclusions about modern statistical pedagogy. Here are a few random comments inspired by Shafer's ideas.

Statistical philosophy depends a lot upon what kind of data one sees. A bombardment of diverse problems from vastly different subject areas, such as we get in the Stanford biostatistics program, mitigates towards frequentism and against Bayesianism. Business schools, where one often sees a small amount of data acting against a considerable background of relevant prior experience, are naturally congenial to the Bayesian point of view.

Statistics can be defined as the science of accumulating information that arrives a small amount at a time, as it does in a clinical trial. Frequentist methods are at their best in such situations. (They are usually built around some form of exchangeability among the small data units.)

Statisticians are sometimes asked to make inferences in situations where the data arrives in just a few big, noncomparable chunks. An example might be a safety analysis for nuclear reactors. Bayesian methods are often the only methods of any use here.

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The fractionation of statistical theory which Shafer deplores can be viewed more kindly: as an evolutionary adaption of the statistical point of view to different data environments.

I share Shafer's preference for statistics departments that look for inspiration outside of pure statistical theory. We are fortunate to have a pressing demand for our services and an endless source of problems of genuine interest to the broader scientific community. Modern music and modern mathematics are two fields that have turned inward on themselves, so that only the initiated can appreciate the true beauty of the results. If statistics has to depend on its beauty, we may be in bad trouble.

The Stanford statistics department, and many others, continues to make joint appointments, most recently with the medical school, the math department (forget that math remark above) and the Linear Accelerator Center.

Statisticians are the only scientists who think systematically about inference. Nonstatistical inference ideas can be embarrassingly naive, even while popular, a recent example being "fuzzy sets." Statistics is not likely to go out of business as long as scientists need to make accurate inferences. Statistics departments may go out of business, though, if we don't attend to scientists' needs.

In the long run, any field is judged by the ideas it produces. We, the current bunch of academic statisticians, are living off the intellectual capital invested by Gauss, Pearson, Student, Fisher, Neyman, Wald, etc. I hope we are generating the ideas that will secure our successor's place in the academy.

Comment: In Praise of the Diversity of Probabilities

Ian Hacking

I write as a philosopher who has long been curious about probability and statistics, but who is not directly affected by the fortunes of statistics departments. I have learned much from Glenn Shafer over the years, and I am taken with his title: unity and diversity. For me, however, diversity's the thing. Not long ago, philosophers of science thought that the unity of science was a goal, a value and an essential part of rational inquiry. They meant that there is one real world, one

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