William Kruskal Remembered

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I knew Bill Kruskal as a dear friend and colleague for over 30 years, but I also knew him as a citizen of his department and university, a statesman of the statistics profession and a researcher in mathematical statistics. In all of those roles Bill showed characteristics he must have developed at an early age: unshakable integrity, consideration for others, painstaking attention to detail and an open, questioning scientific mind. In what I hope would be a spirit of social science inquiry that Bill would have sanctioned, I want to begin by asking a question of Bill that he asked so often of others.

For 30 years, whenever our department met in private session to face a decision on a tenure case, Bill would ask of his colleagues some version of this question: "Tell me," he would ask, "what specific significant new idea would you associate with the candidate; which of the candidate's works or publications are truly important?" Bill's purpose was clear—he wanted focus; he did not want to hear a recital of general impressions, he wanted evidence that would convince him, would convince the dean, would convince the provost and president. I will ask Bill's question about Bill himself, and advance some answers.

My first answer is that Bill will be remembered longest for a particular piece of research work during the 1950s. Bill was first appointed as an instructor in our newly formed department in 1950. The best known of his works is the Kruskal–Wallis test, a rank test for the analysis of variance he proposed in 1951 and then developed with Allen Wallis into a famous article published in 1952 (Kruskal and Wallis, 1952). This simple procedure has had a remarkable run. If you wish to know the extent of its fame, I suggest visiting *Google News*, as I did a few times shortly after Bill died. There the name Kruskal produced from 5 to 15 hits on the *Google News* pages (i.e., the search restricted to news sources of the past month) and almost all of those were

to the use of the Kruskal–Wallis test in several different, newly released scientific studies. Indeed it is astonishing that a simple test proposed over a half century ago is still in current news. If a *Google News* count of 5–15 strikes you as meager, I suggest you try the same test on *Google News* using the name Gauss or Neyman or Pearson or Kolmogorov; in my trial all of these were either absent or merely single hits. If you try the full extent of *Google's* coverage, there are over 900,000 pages for Kruskal–Wallis. For this article alone Bill will be remembered as long as there are web pages, statistical software or textbooks.

If you protest (as Bill perhaps would) that the test is no more than a part of a proper analysis, and a small part at that, I say that misses my point. This longevity is significant evidence of Bill's marvelous ability to explain so clearly and develop his topic so thoroughly that in half a century no one has superceded him as a reference, in the manner that Robert K. Merton called "obliteration by incorporation." Bill's was the first word *and* the last word. Of course this was not his only major research success; he also made important contributions to the measurement of association, some with Leo Goodman, and to coordinate-free linear models and other areas. But Bill's question to his colleagues only asked for one idea: he wanted focus and the consequent detail.

I was careful in describing this test of Bill's as the work for which he will be longest remembered. I do not believe it was his most important contribution. To my mind Bill's greatest contribution was the furtherance of scientific collegiality in our department, in the University of Chicago, in the profession of statistics and indeed in the broad intellectual community of the nation. I would refer to the importance of his role in this as "inestimable," but I am sure Bill would protest because of course I am going to try to estimate it.

In all these spheres he was the soul of collegiality. He nurtured junior faculty. He helped students for whom he had no formal responsibility, with references and problem suggestions. He shared classroom examples and exam questions. By his example he taught us the importance and showed us the intellectual rewards of dedicated attention to teaching at all levels. He instilled

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