Science Editing in the Social Sciences: Methods Belong To All of Us

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Published in *Bulletin de Méthodolgie Sociologique* No. 91, July 2006, pp. 20–24.
Delivered at the XIIth meeting of the International Federation of Science Editors
Merida, Yucatan, Mexico. October 2004

What other science [than medicine] is better suited to propose laws as the basis of the social structure, in order to make effective those which are inherent in man himself? … Medicine is a social science in its very bone and marrow…Rudolph Virchow, Die Einheitsbestrebungen, 1849

I understand that this is the first IFSE panel on editing in the social sciences. My goal today is to make clear that the social sciences should be included in every meeting of IFSE because social science is now, and has always been, real science, including both the production of basic knowledge and the translation of that knowledge into technologies that have real impact on people's lives.

We are accustomed to thinking about the success of the physical and biological sciences, but not about the success of the social sciences. Ask 500 people, as I did in a telephone survey, to list "the major contributions that science has made to humanity" and there is strong consensus: cures for diseases, space exploration, computers, nuclear power, satellite telecommunications, television, automobiles, artificial limbs, and transplant surgery head the list. No one – not one person – mentioned the theory of relativity or the discovery of the double helix. The contributions of science are, in the public imagination, technologies – the things that affect our lives.

Ask those same people to list "the major contributions that the social and behavioral sciences have made to humanity" and you get a long silence on the phone, followed by a raggedy list, with no consensus. I don't know where we went wrong, but social scientists have clearly not been good at making clear to the public the applications value of the knowledge that we produce.

A hundred years ago, physicians were unable to do much about phobias. Knowledge about the stimulus-response mechanism in humans has made possible the treatment and management of phobias, bringing comfort to untold millions of people. (By the way, that same knowledge has brought us ads that get millions of adolescents addicted to nicotine. I never said you'd like all the successes of social science.)

And in industry … In 1895, Frederick Winslow Taylor read a paper before the American Society of Mechanical Engineers, entitled "A piece-rate system," which was the start of

scientific management. Scientific management produced spectacular gains in productivity and profits – and spectacular gains in worker alienation as well. Just as in the natural sciences, the application of social science knowledge can result in great benefits or great damage to humankind.

Everyone in science today uses probability theory and the panoply of statistical tools that have developed from that theory. It is all but forgotten that some of the most basic ideas in statistics were developed in the social sciences and that many of the statistical tools we use today were either generated in or developed in the social sciences.

Probability theory was applied social science right from the start. It was developed in the 17th century by Fermat and Pascal in service to producing better outcomes in games of chance. It was well established in the 1760s and 1770s when Daniel Bernoulli and Jean D'Alambert discussed publicly the pros and cons of large-scale inoculations against smallpox in Paris. This is one of the earliest uses of social science I have found in the making of state policy, but there were soon to be many more – state lotteries, for example – a tax on people who are bad at math – and social security.

When Bismarck instituted a pension plan for retired German workers, his minister of finance – based on sound social science data – suggested that 65 should be the age for retirement. Average life expectancy in Germany was then less than 65 and those workers who made it to 65 could expect only a few years on the government pension. In 1934, life expectancy for men was still less than 65 in the United States when Bismarck's magic number 65 was adopted as the age of retirement. Today, social science data are being used to devise tax structures that will be needed to support retirement and medical care systems for people who live into their 90s.

The idea of regression was conceived by Sir Francis Galton in his study of heredity in sweet peas. The method was developed by Karl Pearson and applied quickly to anthropometry and psychology, as well as to genetics and agriculture. Factor analysis was developed by Charles Spearman in his attempts to measure human intelligence. There was a time when physics was based on deterministic mathematics. Today, physicists are prodigious users of SPSS – the Statistical Package for the Social Sciences. And social science continues to contribute to the general science methodological tool kit.

(1) Conjoint analysis originated in mathematical psychology, and its practical use was developed in marketing. Recently, it has been getting attention from scholars in other fields, particularly product design and engineering, operations research, environmental science, and medicine. In a recent issue of *Gastroenterology* (126,4, A608 Suppl. 2 April 2004) Marshall et al. use conjoint analysis to assess patient preferences for various colorectal screen procedures.
(2) Cultural consensus modeling comes from anthropology and dates to 1986. In a recent issue of the *Journal of General Internal Medicine*, Scott et al. (2004, 19:514) used the consensus model to study agreement about clinical education and practice.

(3) Correspondence analysis was developed in France in the 1960s and 70s. It was brought to the attention of scientists in the English-speaking world in the 1980s by Michael Greenacre, a statistician whose work spans the social and biological sciences. Today, correspondence analysis is used widely in the social and biological sciences and is beginning to be used in physics, paleontology, and other fields, particularly in research on imaging and visualization of data.
(4) Quadratic assignment is a mathematical problem in permutations; in the 1970s, two mathematical psychologists, Lawrence Hubert and James Schultz developed a permutation statistic for comparing whole matrices, based on this problem. The quadratic assignment procedure, or QAP, is now widely used in cognitive research and network research and is finding application in all sciences where comparison of one-mode matrices is required.
(5) Multidimensional scaling was developed at Bell Labs by social scientists. Today, it is used across all the sciences.

To be sure, all social science is not science. A lot of it is social critique and social commentary, and to be sure, this contributes to the image of social science as not real science. From the beginning of modern social science, there have been strong and effective voices against positivism—that is, the thorough application of the scientific method in the study of human thought and human behavior. This split in the social sciences reflects the venerable distinction between the humanities and the sciences—a distinction that C.P. Snow famously called the two-cultures of the academy.

The antipositivists have managed to characterize the divide between humanistic and scientific approaches in social studies as a difference between qualitative and quantitative data and analysis. Key journals in which antipositivists publish include *Qualitative Health Research* (1991), *Qualitative Sociology* (1978), *Qualitative Inquiry* (1993). The call for papers for the First International Congress of Qualitative Inquiry (to be held in May, 2005 at the University of Illinois) notes that: “In the United States, the evidence-based experimental science movement, with accompanying federal legislation … threatens to deny advances in critical qualitative inquiry.”

I have long objected to this division between qualitative and quantitative inquiry. All scientists use both qualitative and quantitative data and do both qualitative (interpretive) and quantitative analysis. Astronomers listen to recordings of sounds from other galaxies; geologists study satellite images of the Earth’s surface; physicians listen to heart beats and use their fingertips to feel anomalies; lengthy narratives dictated into a tape recorder by observers inform students of volcanoes, hurricanes, gorillas, children, married couples, shoppers, and crime scenes.

Across all the sciences, all data, qualitative and quantitative alike, are reductions of our experience. In the social sciences, we are particularly interested in people’s behavior, thoughts, and emotions and the environmental conditions in which people behave, think, and feel. When we reduce our experience of those things to numbers, the result is quantitative data. And when we reduce people’s thoughts, behaviors, emotions and environments to sounds, words, or images, the result is qualitative data.

Today, the methods for collecting, analyzing and visualizing these different types of data are becoming very sophisticated, and they do not belong to a single field. Protein chemists recently developed a method for representing molecular structures in three-dimension and color. Social network analysts have taken up the method to represent the structures of human interaction.

Methods belong to all of us. The journal that I edit, *Field Methods,* is devoted to empirical methods across the social sciences regardless of whether the data are qualitative or quantitative data.

In fact, the way I see it, anyone who uses empirical methods to study human thought and human behavior is a social scientist. That goes for people whose primary identity is not in the social sciences but is in fields like medicine and human biology. Fuster et al. (Human Biology 2004, 76:1–14) isolated the factors that account for inbreeding in Spain using multiple linear regression. In a typical piece of social research, these researchers found that close marriages (uncle-niece, aunt-nephew, first-cousin) were more associated with economic variables, while second-cousin marriages were conditioned by geography and the availability of mates.

Gawande et al. (2003 NEJM 348:229) studied 54 cases of patients who had sponges or instruments left in them after surgery, and 235 controls. One finding: People who had emergency surgery were nine times more likely to experience this problem than were patients whose surgery was scheduled. This calculation is also a classic piece of social science: analysis of behavior, use of odds ratios to determine risk, and so on. In fact, the top medical journals are now full of social science articles.

Wilkinson et al. (BMJ 2004 329:647) used a population based cohort design to find out the excess mortality risk in Britain for people over 75 during the winter. One result: people over 75 in Britain have a 1.3-to-1 increase in mortality risk, but hardly any of this is due to being poor. This is yet another example of classic social science.

The challenge for editors of journals in the biomedical sciences is to find reviewers who can fairly evaluate the methods in this new genre of biomedical research. This means breaking down the barriers between disciplines in seeking out reviewers. *Field Methods* is an international, quarterly journal of research methods in the social sciences. I use the online databases to find reviewers, from any field, who have published on the use of a particular method in a peer-reviewed journal in the last few years. Many colleagues from various disciplines respond quickly and positively to this cold-call request for review. I am convinced that this is because the topic of research methods transcends all disciplinary allegiances.

Methods really do belong to all of us.