The Future of the Behavioral and Social Sciences

Philip M. Smith* and Barbara Boyle Torrey

Virtually all public issues involve understanding human behavior. Current demands on behavioral and social science research include understanding violence, predicting economic and demographic transitions, and improving human performance and learning. These sciences are also critical to research in the physical and life sciences, providing insight into such subjects as the interaction of population and the environment, the relation between genes and behavior, and the interaction of humans and machines. But the infrastructure for the behavioral and social sciences is not keeping up with these demands. Not only has federal funding for behavioral and social science research declined 12% in real terms since 1971, but the share of total federal research funding for these sciences has fallen from 8 to 4.5% (Fig. 1) (*1*). Though philanthropic foundations are important, the federal government continues to be the principal source of funds for social and behavioral science research. Funding limitations have affected not only research support but also the training of new scientists. Federal financial support for full-time behavioral and social science graduate students was only 8 and 6%, respectively, of total support in 1991 compared with 21% for all sciences (*2*). New doctorates in behavioral and social sciences have declined from 21% of all new scientific doctorates in 1983 to 17% in 1993.

Neither federal funding nor the political climate of support has been stable, and some would target the behavioral and social sciences at the National Science Foundation (NSF) for disproportionate future cuts. Here, we discuss the irony of increasing demands and decreasing resources, suggest five challenges to both funders and scientists, and discuss several policy implications of meeting these challenges.

Scientific Advances

The contributions of the behavioral and social sciences in the 20th century have been well documented (*3*, *4*). In behavioral science much of the recent research has focused on the brain, structural linguistics, human learning, and memory. Understanding the adaptive processes of the mind is improving the development of educational standards. But the basic behavioral and neurological findings have also influenced the development of computer sciences and the accuracy of diagnostic systems (*5*).

The development of major public-use data tapes of censuses and surveys in the United States revolutionized social science. Survey information has helped researchers measure the rates of return to human capital, educational progress, and the growth of the aged population expected in the 21st century (*6*). Not every new insight results in changes in public policy or practices, but many do; for instance, a single result of game theory that changed the auction rules of the Federal Communications Commission has resulted in an estimated increase in federal revenues of $1 billion (*7*).

Current Challenges

The behavioral and social sciences have made enough progress for us to know that the subject of their research is much more complex than their tools. As a result, the infrastructure of research in these areas is increasingly inadequate to the complexity of their tasks. And the challenges expand with each question, which can be only partly answered with current data and methodologies. Recognition of the fundamental complexity of human and social behavior requires a renewed commitment to the data and methodologies used to study them. We discuss five general challenges to both funders and scientists. The application of these general challenges is likely to vary by specific discipline.

1) *Integrate current data sets.* Within the United States, over 70 federal agencies collect survey data, and many more surveys are conducted by the private sector. Each survey is collected for its own specific purposes, and because each one has a different sponsor, there is little coordination to either enhance sample size or to improve analyses of the variables collected. There are few joint protocols and fewer methodologies to promote the accumulation of knowledge from the surveys. Although meta-analysis of biological and behavioral experiments shows promise, it is not a substitute for well-integrated surveys that investigate multiple issues. Systematic documentation, archiving, and coordination of federal social and behavioral data and of public and private surveys would improve sample sizes, increase the variables that could be studied, and, in general, expand the kinds of research that need to be done. It would also reduce the collection of underused data and their expense and increase electronic accessibility of data throughout the world. Of course, privacy in survey research remains an issue, but new computer technologies that make survey integration possible also hold the promise of providing privacy safeguards.

2) *Improve the coverage of longitudinal surveys.* Over 200 longitudinal behavioral and social surveys have been inventoried (*8*), including behavioral science surveys on such issues as crime and human development and social science surveys of social and economic dynamics. But fewer than 20 have nationally representative samples, and only two of those include most age cohorts and income deciles. Longitudinal data are important for studying individual transitions and the cumulative effects of life cycle transitions on later-life outcomes (*9*) and for studying cultural differences and changes. Longitudinal research on transitions is also important in understanding the life cycles of social conflicts, the evolution of governance, and the development of economies.

Understanding the transitions of dynamic systems, whether of individuals, societies, or economies, requires theories of dynamic processes and then sufficient longitudinal data to test those theories. Therefore, filling the gaps in the extant longitudinal surveys systematically is important if the natural history of transitions is to be understood and used for public policy. Improving these surveys would also increase the sample sizes of subpopulations, such as recent immigrants. This is an issue of particular importance in soci-

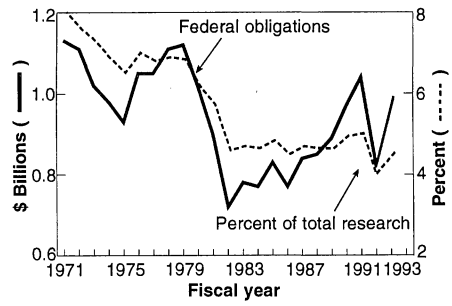

Fig. 1. Total federal obligations for social and psychological research in constant dollars (1987) (solid line) and social and psychological research as a percent of total federal research obligations (dashed line) (from National Science Foundation data).

P. M. Smith is a partner, McGeary and Smith, 464 M Street SW, Washington, DC 20024, USA. E-mail: psmith@nas.edu. B. B. Torrey is executive director of the Commission on Behavioral and Social Sciences and Education, National Research Council, Washington, DC 20418, USA. E-mail: btorrey@nas.edu. This policy forum does not necessarily represent the views of the National Research Council.

*To whom correspondence should be addressed.

eties as heterogeneous as that of the United States.

3) *Experiment with new methodologies to study nonlinear, dynamic systems.* No matter how good the data are, they will always be limited by their time horizon and level of aggregation. Some scientists have been experimenting with methodologies to analyze dynamic systems that range in scale from the individual to the economy (*10*). Methodologies based on computer models allow theorists to develop several fundamental decision rules for the interaction of random, individual elements.

Those who study dynamic systems such as human behavior are appropriately modest about their ability to predict future developments. However, studying adaptive, dynamic behavior may yield insights into the dynamics of change, clarify the assumptions about interactions and transitions, and reveal flaws in assumptions that may be too subtle to see in static analyses. The challenge for the behavioral and social sciences is to determine whether the methodologies that have been developed to study dynamic systems will fundamentally advance our understanding of human behavior at both the individual and group level.

4) *Develop comparable international research to determine both the incidence and prevalence of behavioral and social phenomena.* Inevitably, behavioral and social scientists need to determine whether the phenomena they are studying are unique to a culture or prevalent in societies around the world. Considerable research has already been done on comparative governments, cultures, and foreign policies; however, there are few comparable, nationally representative international surveys that can be used to make international household comparisons. The Demographic and Health Surveys have comparable surveys for 35 developing countries that are used to study fertility and health behavior, and the Luxembourg Income Study has comparable household surveys for 25 developed countries to promote research on income and welfare (*11*), but both are incomplete for studying a broad range of other social issues.

Other sciences have had international collaborations for years. Nearly 40 years ago geophysicists from around the world used the International Geophysical Year (1957–58) to coordinate data collection, establishing a four-decade pattern of collaborative observations and experiments. Currently, the Human Genome Project is coordinating the international collection of data on 3 billion nucleotides (*12*). Both efforts serve as challenges to scientists in the social and behavioral sciences to become more ambitious in their use of international research to give both perspective and context to their own work.

5) *Integrate quantitative and qualitative research methods more systematically to advance new theory.* In the end, good data and sophisticated methodology can encourage asking the right scientific questions, but they are not substitutes for them. Scientific theories come not only from quantitative data, but also from qualitative study. History, in particular, is an underused resource in American social science compared with European social science (*13*). The more complex the problem, the more numerous are the sources of evidence needed, such as structured observations, formal case studies, and historical research. These sources are necessary for the robust development of behavioral and social science theory. Rigorous advances in the theory are necessary not only to make sense of the data, but also to improve the experimental design and advance the investigations in behavioral and social sciences.

Policy Implications

Studying the long life cycle of human development and social change is incongruous with the annual life cycle of federal funding and short time horizons of political democracies. None of the challenges discussed above would be costless, but they also need not be expensive. However, they would require long-term continuity of federal support and funding, and they would require the coordination of research by scientists and government officials with different substantive interests and priority setting within disciplines.

Researchers in these disciplines must renew their efforts to set priorities both within and among the disciplines. These priorities must balance the need for funds for larger scale, more costly work that would meet the challenges we have raised with the need for funds for grants to individual researchers and small teams. The training of the next generation of behavioral and social scientists is also critically important; increased use of training grants may offer the best avenue of support for graduate students (*14*). If the disciplines assume leadership in these actions, then the government should increase funding for these sciences even in light of overall budgetary pressures on research and development.

The behavioral and social sciences continue to be poorly understood by both the public and elected officials. That is partly because personal experience in behavioral and social issues is often a more powerful influence than scientific evidence, especially when the two conflict. The burden of communication rests with the behavioral and social scientists to demonstrate that they have valuable, concrete evidence that can be used to address social issues. The use of the evidence by the public and its elected officials will help ensure a more rational dialogue on societal issues.

REFERENCES AND NOTES

1. "Federal funds for research and development: Federal obligations for research by agency and detailed field of science and engineering: Fiscal years 1971–1994," National Science Foundation, 94-332 (Quantum Research Corporation, Washington, DC, 1994).
2. National Science Board, *Science and Engineering Indicators—1993* (Government Printing Office, Washington, DC, 1993).
3. K. W. Deutsch, J. Platt, D. Senghaas, *Science* **171**, 450 (1971).
4. D. Luce, N. Smelser, D. Gerstein, Eds., *Leading Edges in Social and Behavioral Science* (Russell Sage Foundation, New York, 1989).
5. J. A. Swets, *Science* **240**, 1285 (1988).
6. L. G. Martin and S. H. Preston, Eds., *Demography of Aging* (National Academy Press, Washington, DC, 1994).
7. The recent investigations were done by Robert Wilson and Paul Milgrom and tested by Charles Plott. The Congressional Budget Office estimated the surplus revenue generated.
8. C. H. Young, K. L. Savola, E. Phelps, *Inventory of Longitudinal Studies in the Social Sciences* (Sage, New York, 1991).
9. R. W. Fogel, *Am. Econ. Rev.* **84** (3), 369 (1994).
10. L. Thelen and A. Smith, *A Dynamic Systems Approach to the Development of Cognition and Action* (Massachusetts Institute of Technology, Cambridge, 1994).
11. T. M. Smeeding and B. B. Torrey, *Science* **242**, 873 (1988).
12. *Mapping and Sequencing the Human Genome* (National Academy Press, Washington, DC, 1988).
13. D. Ross, *The Origins of American Social Sciences* (Cambridge Univ. Press, Cambridge, UK, 1991).
14. National Research Council, *Reshaping the Graduate Education of Scientists and Engineers* (National Academy Press, Washington, DC 1995).