

The Study of Public Reasoning

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Introduction

A key area where the social sciences can contribute both theoretically and pragmatically to the science of science policy is via *the study of public reasoning*.

Perhaps most obviously, the study of public reasoning in the social sciences examines how science advice is brought to bear on policy decisions. Science policy has long been classified in a binary fashion—policy-for-science and science-for-policy—with the former receiving the lion’s share of attention. As has become clear recently, however, the nation’s ability to deploy science credibly in support of policy decisions is an essential element in securing broader public trust in democratic governance (Ezrahi 1990). Moreover, securing credible science advice has proven neither simple nor straightforward in many cases (Jasanoff 1990), leading to the elaboration of extensive policies governing the information and knowledge flows entering the policy process. Not only do these policies establish rules and procedures for the scientific advisory process itself, but they also often establish standards for knowledge production (as in NIH and FDA guidelines and auditing of clinical trials) and even pursue research and inquiry internal to regulatory processes (as in EPA laboratories and external grant programs designed to serve EPA rulemaking). In terms of broad legislation in the United States, for example, relevant policies include the Administrative Procedures Act, the Federal Advisory Committee Act, the Data Quality Act, the Freedom of Information Act, recent OMB guidelines for peer review, etc. These policies enable and constrain the creation, dissemination, review, and use of scientific and expert advice in policy contexts. A science of science policy must therefore grapple persuasively with these dimensions of policy-for-regulatory-science if it is to provide a strong foundation for future policymaking.

Public reasoning, of course, is broader than simply the provision of scientific or expert advice. Science advice is one element in a diverse array of formal and informal means by which societies identify, frame, evaluate, and make sense of the policy challenges they face. Also important are the policy sciences (e.g., cost benefit analysis, policy analysis), statistical data collection and analysis (e.g., inflation, crime, demographics), lay and indigenous knowledges, cultural narratives, legal constructions of facts, and many more elements of what has also been called *civic epistemologies*—the standards of evidence, forms of expertise, norms of warrant and review, and styles of reasoning that characterize the formation, deliberation, and implementation of public policy. Science advice is thus but one part of a more complex, dynamic interplay of social ideas that shapes the ultimate

winnowing and selection of policy choices, as well as public reactions to major policy events and crises. Here, too, the social sciences are prepared to contribute in important ways to understanding this dynamic interplay of ideas and, especially the role of science and expertise in relation to other, competing models of knowledge and rationality.

In what follows I describe three key contributions where I think social science research on public reasoning has made significant contributions to science policy and is prepared to continue to do so. These include (1) the identification, analysis, and potential resolution of multiple, conflicting styles of reasoning; (2) the design and analysis of reflexive governance; and (3) the strengthening of democracy in national and global contexts.

Resolving conflicting styles of reasoning

In recent decades, myriad public policy choices have given rise to intense disputes over the truth status of knowledge claims in international affairs. Diverging interpretations of evidence and analysis have occurred over the risks of climate change and biodiversity loss, the status of Iraqi, North Korean, and Iranian nuclear facilities, the safety of trade in genetically modified organisms, and the adequacy of plans for containing outbreaks of emerging diseases, to name only a few. In this respect, global politics increasingly mirrors its domestic counterpart, for which disputes over knowledge claims have become an endemic element of modern and postmodern politics (see, e.g., Nelkin 1984; Epstein 1996).

An important element of these conflicts results from significant divergences in what the philosopher Ian Hacking calls *styles of reasoning*. Hacking's work focuses on competing modalities of reasoning within the scientific community: interlocking forms and standards of evidence, problem framing, and logical analysis (Hacking 2002). Building on similar ideas, research on comparative politics and regulation has also identified distinctive styles of reasoning operating in the ways that cultures frame and analyze risk (Jasanoff 2005, 1995a, 1986; Parthasarathy 2004; Daemmrich and Krucken 2000; Rayner and Malone 1998; Krimsky and Plough 1988). At play are divergent normative and institutional frameworks for integrating scientific and expert advice into distinctive constitutional politics. Institutions and cultures vary in how they define who counts as an expert for the purpose of advising policy, requisite standards of evidence and proof, how problems get framed, and the treatment of uncertainty. Brought into dialogue in global politics, divergent national styles of reasoning (embedded in national political cultures) become seeds of international conflict in an era of globalization.

Social science research can help science policy confront the increasingly numerous challenges cultural divergences in styles of reasoning pose for international governance. Analyses of conflicting styles of reasoning can help explain why particular disputes arise and how they get resolved (or not) within emerging institutions and frameworks for international governance (Miller forthcoming, b). They can also contribute to identifying and evaluating novel approaches for overcoming such conflicts and for establishing robust approaches to global reasoning that can speak credibly to myriad, heterogeneous

publics in global society (Miller 2005, forthcoming, a; Jasanoff 1998). Relevant work would be positioned, for example, to assist the World Trade Organization in resolving differences between U.S. and European risk analysis frameworks (Winickoff et al. 2005, 2004) or to help the International Atomic Energy Agency and major powers develop more sophisticated mechanisms for validating competing claims regarding nuclear non-proliferation treaty violations.

The design of reflexive governance

The U.S. Army Corps of Engineers internal report on the impact of Hurricane Katrina on New Orleans levies, as well as similar reports by other agencies and groups, documented a widespread series of failures in both the initial design and construction of the levies as well as the systematic monitoring of the levy infrastructure over time. Supplemented by historical and sociological accounts of other natural disasters and technological accidents, as well as policy failures, these reports suggest significant problems in contemporary governance in how knowledge concerning the creation and monitoring of scientific and technological systems is constructed, synthesized, validated, and applied (see, e.g., Goldman 2005; Scott 1998; Jasanoff 1994; Perrow 1986; Wynne 1982). These problems highlight an additional important contribution that social science research on modes of reasoning can make by analyzing the modes of reasoning underpinning policy decisionmaking in the governance of science and technology. Just as importantly, they suggest the need for a more systematic effort to apply social science research to the challenge of designing more *reflexive forms of governance* that systematically attend to their own epistemological and ontological frameworks and the knowledge framings, tacit assumptions, normative commitments, and power relationships they embed.

In the case of Katrina, for example, a more reflexive Corps of Engineers might have recognized a number of limitations in its own analyses. For example, more sophisticated reflection on the Corps' monitoring of New Orleans' levies might have revealed both the inadequacies of the monitoring system—and, if corrected, might also have revealed the structural problems left over from poor construction (which might themselves have been identified and repaired at an earlier stage if the oversight of the construction had been carried out with a more fine-tuned sensibility to the vagaries and uncertainties of technological systems). The Corps might also have been more carefully attuned to the potential limitations of its framing of the problem of storm surge and might have identified the need for further study of what might happen if the water entered the levy system from a different direction than expected. Or, the Corps (or perhaps more appropriately the Federal Emergency Management Agency) might have realized the ways in which levy technologies, class, and race were combining to create particularly vulnerable communities within New Orleans and to prepare to address those vulnerabilities.

Reflexivity is a term borrowed from the sociology of scientific knowledge literature that emphasizes the capacity of social arrangements to recognize, acknowledge, and factor into knowledge claims the limitations, assumptions, and power relationships of any given epistemological framework—to reflect, in other words, on one's own knowledge-making

processes in the act of making and applying knowledge. Reflexive governance thus implies the capacity to reflect on the styles of public reasoning at play in policy choices and to make allowances for the constructed character of that reasoning as policy issues are identified, defined, assessed, and resolved. As understood here, reflexive governance applies both to particular institutional decision-making contexts where various forms of expert knowledge are applied as well as to the broader constellations of public decision-making processes in contemporary societies, including not only executive agencies but also legislative and judicial bodies and civil society. Obviously, the functioning of reflexivity will be different at these different scales, however.

In addition to the large-scale technological systems discussed above, the social dislocations associated with new and emerging technologies are another context in which the study of reflexive governance could offer important contributions. New and emerging technologies often raise complex notions of risk that cannot be fully captured by existing risk analytic methods. They also often pose challenges to more fundamental notions in society, such as responsibility, privacy, agency, and causality. Understanding at many intersecting levels of society how publics acquire, collate, and assess information about new and emerging technologies would be of considerable value in the formulation of science policy. So, too, would analyses of existing processes for managing technological change, such as those embodied in the U.S. Food and Drug Administration and Environmental Protection Agency, as well as the less structured frameworks of legal interpretation and precedent for resolving technological conflict (see, e.g., Jasanoff 1995b) or a variety of still more informal avenues of social mobilization and critique. How does reflexivity work in these institutions, in different issue area and cultural contexts? What, in other words, does it mean for governance to be reflexive? How would one recognize it action? How do reflexive elements of governance work?

From such studies, it would be possible to begin to develop insights into the design of reflexive governance institutions (Miller 2003, 2004a), drawing not only on the social study of knowledge systems but also on literatures in organizational learning and institutional change. Such research could address challenges such as the systematic institutionalization of critical review into knowledge-making processes; the identification of gaps between expected and achieved outcomes; the design of processes for scanning society for changes that may challenge existing framings and modalities of reasoning; identifying, understanding, and resolving conflicts among styles of reasoning; systematic comparison as a learning model; sampling public values and perspectives and incorporating public consultation; dispute resolution (and also, maybe, the fostering of appropriate forms of dispute); acknowledging and managing uncertainty; and building capacity to respond to novelty and change.

Strengthening democracy

The final contribution social scientists are poised to make to science policy through the study of public reasoning is to strengthening democratic forms of governance. Put simply, science and technology are central elements in liberal democracy (Ezrahi 1990; Kleinman 2000). Historically, science has played important roles in a wide range of

settings in supporting the emergence of democratic forms of civil society (Nyhart and Broman 2002) and has been embedded in the broad transformation of democratic politics wrought by the Progressive and New Deal states (Hays 1959), which brought experts into the organization of the U.S. federal government by the tens of thousands. In the latter half of the 20th century, this bureaucratization of expertise was supplemented by the extensive construction of scientific advisory committees that brought external expertise to bear on the use of technical knowledge in the nation's regulatory agencies (Hilgartner 2000; Jasanoff 1990).

While many theories of democracy recognize the contribution of expertise to deliberation and democratic decision-making, these frameworks rarely if ever incorporate the increasing depth of social science understanding of the construction of science and scientific advice. Theories of deliberation, for example, rarely explore in depth how various kinds of claims acquire credibility in deliberative contexts and the implications of variations across domains of claims-making for democratic processes. Likewise, even in the aftermath of the Bush-Gore contested election in 2000, analyses of electoral stability and processes in mainstream democratic theory paid scant attention, at best, to the ways in which knowledge claims were made, contested, and resolved in electoral politics, thus missing critical elements and leading to problematic proposals for electoral reform (Miller 2004b; Lynch et al. 2001).

There is a broad need, therefore, to apply systematic social science insights to our understanding of contemporary democracies, which largely came to be centered in the 20th century on the politics, governance, management, and application of scientific knowledge and technological systems, from the regulatory politics of EPA and FDA to questions of defense and homeland security, the mass-production consumer economy, transportation, the Internet, health care, etc. This is especially true today, in the context of widespread conflict over the public status of science in both regulatory governance and, more broadly, in civic life. While conflicts over the politicization of science advice and the teaching of evolution in schools are hardly new, public debates over these issues remain caught up in fundamental misunderstandings of the role of science in contemporary democratic forms of governance.

Arguably even more importantly, there is a need to apply this research to the challenge of designing new forms of global governance. Although globalization is often understood primarily in economic terms, it is clear that it is also a deeply scientific and technological transformation of social relationships. Critical problems in contemporary international relations, from efforts to regulate climate change, nuclear proliferation, and emerging diseases to the Internet, cloning, and HIV/AIDS depend on elaborate efforts to systemically collect, analyze, and apply expert knowledge to the governance of global-scale technological systems (e.g., in energy production, transportation, forestry, pharmaceuticals, etc.). Precisely because these governing arrangements are novel, and thus still fragile and, in many cases, weak and ineffective, and lack the kind of systematic support provided in national governance by constitutional frameworks, there is considerable need for robust analyses of how these systems can be strengthened in ways that are consistent with democratic principles. Recent studies have illustrated the

potential contributions social scientists can make in this regard, both with respect to the organization of international scientific advisory processes (Miller forthcoming, a) and, more generally, in the transformation of diplomatic processes toward greater deliberation (Miller forthcoming, b).

Training

By way of conclusion, I want to highlight the need not only for social science research on public reasoning but also the need for more systematic training opportunities in this field. While a handful of graduate training programs were established in the fields of science policy and science studies in the early 1990s, these programs train students in the study of public reasoning only at the margins. At the same time, there has been little subsequent progress in expanding the institutionalization of these fields since the early 1990s to other universities. For the most part, these topics also do not attract significant attention within the fields of political science or public affairs. Consequently, it is fair to say that there are currently no systematic graduate training programs in the study of processes of public reasoning.

Two kinds of graduate training programs would be of considerable value. The first would focus on PhD education at the intersection of science policy, science studies, and political science. Here, the ambition would be to prepare future academic researchers to participate in the ambitious tasks set out in the previous sections. The second kind of graduate program would focus on professional education at the Master's level, with an emphasis on translating research insights on public reasoning into concrete skills to be put to work in the management of technical agencies and policy settings where knowledge is brought to bear on policy choices. Relevant skills and knowledge would include such areas as knowledge systems analysis, technological systems analysis, design of reflexive governance institutions, theories of science and democracy, techniques of public consultation, and so forth.

At the professional level, a degree in the management of public reasoning would parallel existing degrees in public affairs and public policy. Public reasoning is a central element in all government policymaking. Yet, few if any public affairs programs offer in depth skills in applying insights from the last three decades of social science research on knowledge and expertise in the policy process to the making of public management and public policy decisions. To make headway, significant efforts need to be made to create a generation of public managers and administrators who will work to transform institutional processes of knowledge creation, integration, critique, and application from the inside and who are able to build effective networks with the social science research community to bring new ideas into the public management process.

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