
Introduction: epistemic communities and international policy coordination

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The growing technical uncertainties and complexities of problems of global concern have made international policy coordination not only increasingly necessary but also increasingly difficult. If decision makers are unfamiliar with the technical aspects of a specific problem, how do they define state interests and develop viable solutions? What factors shape their behavior? Under conditions of uncertainty, what are the origins of international institutions? And how can we best study the processes through which international policy coordination and order emerge?

While a variety of analytic approaches have been used to address the problems of international cooperation, the approaches have yielded only fragmentary insights. At its core, the study of policy coordination among states involves arguments about determinism versus free will and about the ways in which the international system is maintained and transformed. Among the overlapping topics of debate are whether national behavior is determined or broadly conditioned by system-level factors, unit-level factors, or some complex interplay between the two; whether state policymakers can identify national interests and behave independently of pressures from the social groups they nominally represent; and whether states respond consistently to opportunities to create, defend, or expand their own wealth and power, to enhance collective material benefits, or to promote nonmaterial values.¹ A related question of

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1. See, for example, Alexander E. Wendt, "The Agent-Structure Problem," *International Organization* 41 (Summer 1987), pp. 335–70; Margaret S. Archer, "Morphogenesis Versus Structuration: On Combining Structure and Action," *British Journal of Sociology* 33 (December 1982), pp. 455–83; David Dessler, "What's at Stake in the Agent-Structure Debate?" *International Organization* 43 (Summer 1989), pp. 441–73; Peter Gourevitch, "The Second Image Reversed: The International Sources of Domestic Politics," *International Organization* 32 (Autumn 1978), pp. 881–912; Peter J. Katzenstein, ed., *Between Power and Plenty: Foreign Economic Policies of*

debate is the extent to which state actors fully recognize and appreciate the anarchic nature of the system and, consequently, whether rational choice, deductive-type approaches or interpretive approaches are most appropriate for the study of international cooperation.²

In focusing on the structure of international or domestic power in their explanations of policy coordination, many authors ignore the possibility that actors can learn new patterns of reasoning and may consequently begin to pursue new state interests. While others mention this possibility, few investigate the conditions that foster a change in state interests and the mechanisms through which the new interests can be realized.³

In this volume of articles, we acknowledge that systemic conditions and domestic pressures impose constraints on state behavior, but we argue that there is still a wide degree of latitude for state action. How states identify their interests and recognize the latitude of actions deemed appropriate in specific issue-areas of policymaking are functions of the manner in which the problems are understood by the policymakers or are represented by those to whom they turn for advice under conditions of uncertainty. Recognizing that human agency lies at the interstices between systemic conditions, knowledge, and national actions, we offer an approach that examines the role that networks of knowledge-based experts—epistemic communities—play in articulating the cause-and-effect relationships of complex problems, helping states identify their interests, framing the issues for collective debate, proposing specific policies, and identifying salient points for negotiation. We argue that control over knowledge and information is an important dimension of power and that

Advanced Industrial States (Madison: University of Wisconsin Press, 1977); Peter J. Katzenstein, *Small States in World Markets* (Ithaca, N.Y.: Cornell University Press, 1986); Robert Putnam, "Diplomacy and Domestic Politics: The Logic of Two-Level Games," *International Organization* 42 (Summer 1988), pp. 427–60; Peter B. Evans, Dietrich Rueschemeyer, and Theda Skocpol, eds., *Bringing the State Back In* (Cambridge: Cambridge University Press, 1985); Eric A. Nordlinger, "Taking the State Seriously," in Myron Weiner and Samuel P. Huntington, eds., *Understanding Political Development* (Boston: Little, Brown, 1987), pp. 353–90; Roger Benjamin and Raymond Duvall, "The Capitalist State in Context," in Roger Benjamin and Stephen L. Elkin, eds., *The Democratic State* (Lawrence: University Press of Kansas, 1985), pp. 19–57; Stephen D. Krasner, "Approaches to the State," *Comparative Politics* 16 (January 1984), pp. 223–46; and Howard M. Lentner, "The Concept of the State: A Response to Krasner," *Comparative Politics* 16 (April 1984), pp. 367–77.

2. See Robert O. Keohane, "International Institutions: Two Approaches," *International Studies Quarterly* 32 (December 1988), pp. 379–96.

3. Krasner acknowledges the importance of shared beliefs in explaining the Group of 77 (G-77) cooperation and also discusses the role of shared understanding in regime creation. See the following works of Stephen D. Krasner: *Structural Conflict* (Berkeley: University of California Press, 1985), p. 9; and "Regimes and the Limits of Realism: Regimes as Autonomous Variables," in Stephen D. Krasner, ed., *International Regimes* (Ithaca, N.Y.: Cornell University Press, 1983), p. 368. Keohane notes the possibility that states may learn to recalculate their interests, and Gilpin also acknowledges that states occasionally "learn to be more enlightened in their definitions of their interests and can learn to be more cooperative in their behavior." See Robert O. Keohane, *After Hegemony* (Princeton, N.J.: Princeton University Press, 1984), pp. 131–32; and Robert Gilpin, *War and Change in World Politics* (Cambridge: Cambridge University Press, 1981), p. 227.

the diffusion of new ideas and information can lead to new patterns of behavior and prove to be an important determinant of international policy coordination.

An epistemic community is a network of professionals with recognized expertise and competence in a particular domain and an authoritative claim to policy-relevant knowledge within that domain or issue-area.⁴ Although an epistemic community may consist of professionals from a variety of disciplines and backgrounds, they have (1) a shared set of normative and principled beliefs, which provide a value-based rationale for the social action of community members; (2) shared causal beliefs, which are derived from their analysis of practices leading or contributing to a central set of problems in their domain and which then serve as the basis for elucidating the multiple linkages between possible policy actions and desired outcomes; (3) shared notions of validity—that is, intersubjective, internally defined criteria for weighing and validating knowledge in the domain of their expertise; and (4) a common policy enterprise—that is, a set of common practices associated with a set of problems to which their professional competence is directed, presumably out of the conviction that human welfare will be enhanced as a consequence.⁵

The causal logic of epistemic policy coordination is simple. The major dynamics are uncertainty, interpretation, and institutionalization. In international policy coordination, the forms of uncertainty that tend to stimulate demands for information are those which arise from the strong dependence of states on each other's policy choices for success in obtaining goals and those

4. The term "epistemic communities" has been defined or used in a variety of ways, most frequently to refer to scientific communities. In this volume, we stress that epistemic communities need not be made up of natural scientists or of professionals applying the same methodology that natural scientists do. Moreover, when referring to epistemic communities consisting primarily of natural scientists, we adopt a stricter definition than do, for example, Holzner and Marx, who use the term "epistemic community" in reference to a shared faith in the scientific method as a way of generating truth. This ignores that such faith can still bond together people with diverse interpretations of ambiguous data. By our definition, what bonds members of an epistemic community is their shared belief or faith in the verity and the applicability of particular forms of knowledge or specific truths. Our notion of "epistemic community" somewhat resembles Fleck's notion of a "thought collective"—a sociological group with a common style of thinking. It also somewhat resembles Kuhn's broader sociological definition of a paradigm, which is "an entire constellation of beliefs, values, techniques, and so on shared by members of a given community" and which governs "not a subject matter but a group of practitioners." See Burkhard Holzner and John H. Marx, *Knowledge Application: The Knowledge System in Society* (Boston: Allyn & Bacon, 1979), pp. 107–11; Ludwig Fleck, *Genesis and Development of a Scientific Fact* (Chicago: University of Chicago Press, 1979; translated from the 1935 edition printed in German); and Thomas S. Kuhn, *The Structure of Scientific Revolutions*, 2d ed. (Chicago: University of Chicago Press, 1970), pp. 174–210, with quotes drawn from pp. 175 and 180. Regarding scientific communities, see also Michael Polanyi, "The Republic of Science," *Minerva*, vol. 1, 1962, pp. 54–73.

5. Other characteristics of epistemic communities that were mentioned or discussed during the preparation of this volume included the following: members of an epistemic community share intersubjective understandings; have a shared way of knowing; have shared patterns of reasoning; have a policy project drawing on shared values, shared causal beliefs, and the use of shared discursive practices; and have a shared commitment to the application and production of knowledge. These phrases were not incorporated in the formal definition listed here; they are simply provided to evoke additional notions that are associated with epistemic communities.

which involve multiple and only partly estimable consequences of action. Examples drawn from the studies presented here include the uncertainties about strategies to avert nuclear destruction and the uncertainties about how to respond to the hypothesized threats to an invisible layer of ozone located seven to fifteen miles above the earth's surface. These forms of uncertainty give rise to demands for particular sorts of information. The information needed does not consist of guesses about others' intentions, about the probability of discrete events occurring, or about a state's own ability to pursue unilaterally attainable goals that are amenable to treatment by various political rules of thumb. Rather, it consists of depictions of social or physical processes, their interrelation with other processes, and the likely consequences of actions that require application of considerable scientific or technical expertise. The information is thus neither guesses nor "raw" data; it is the product of human interpretations of social and physical phenomena.

Epistemic communities are one possible provider of this sort of information and advice. As demands for such information arise, networks or communities of specialists capable of producing and providing the information emerge and proliferate. The members of a prevailing community become strong actors at the national and transnational level as decision makers solicit their information and delegate responsibility to them. A community's advice, though, is informed by its own broader worldview. To the extent to which an epistemic community consolidates bureaucratic power within national administrations and international secretariats, it stands to institutionalize its influence and insinuate its views into broader international politics.

Members of transnational epistemic communities can influence state interests either by directly identifying them for decision makers or by illuminating the salient dimensions of an issue from which the decision makers may then deduce their interests. The decision makers in one state may, in turn, influence the interests and behavior of other states, thereby increasing the likelihood of convergent state behavior and international policy coordination, informed by the causal beliefs and policy preferences of the epistemic community. Similarly, epistemic communities may contribute to the creation and maintenance of social institutions that guide international behavior. As a consequence of the continued influence of these institutions, established patterns of cooperation in a given issue-area may persist even though systemic power concentrations may no longer be sufficient to compel countries to coordinate their behavior.

By focusing on the various ways in which new ideas and information are diffused and taken into account by decision makers, the epistemic communities approach suggests a nonsystemic origin for state interests and identifies a dynamic for persistent cooperation independent of the distribution of international power. It assumes that state actors are uncertainty reducers as well as power and wealth pursuers. It also seeks to explain the substantive nature of coordinated policy arrangements, a subject on which many structural analysts are notably silent. Yet to some extent, the approach supplements structural

theories of international behavior: in response to new knowledge articulated by epistemic communities, a state may elect to pursue entirely new objectives, in which case outcomes may be shaped by the distribution of information as well as by the distribution of power capabilities. Table 1 presents a schematized outline of the epistemic communities approach and compares it with other approaches to the study of policy change that have been advanced by international relations scholars.

Pursuing the epistemic communities approach, contributors to this volume analyze the impact of five epistemic and two epistemic-like communities on decision making in a variety of issues concerning the international political economy, international security, and the environment. In analyzing the processes leading to policy coordination in a specific issue-area, each author describes the membership and shared beliefs of an expert community, traces the community's actions, and discusses its impact. By comparing the beliefs and behavior of policymakers in one country over time and by comparing them in countries in which expert communities were active versus those in which they were not, the authors try to specify the extent to which decision-making processes were influenced by the community as opposed to the political factors and actors emphasized in other approaches to international relations.

The articles by William Drake and Kalypso Nicolaidis, Emanuel Adler, M. J. Peterson, and Peter Haas investigate the ways in which epistemic communities initially framed the issues for collective debate, thereby influencing subsequent negotiations and bringing about their preferred outcomes to the exclusion of others in the cases involving trade in services, nuclear arms control, management of whaling, and protection of stratospheric ozone. In the whaling and ozone cases, the authors also outline the role that epistemic communities played in identifying specific policies for national and collective adoption. In the study regarding the principles and practices of food aid, Raymond Hopkins traces the changes in the beliefs and understandings of the epistemic community that had a hand in the food aid regime and links these changes to regime reforms. Ethan Kapstein's analysis of banking regulators and G. John Ikenberry's analysis of economists involved in the Anglo-American postwar economic settlement both shed light on the epistemic communities approach by discussing factors that differentiate these expert groups from the epistemic communities discussed in the other case studies included here. And James Sebenius adds an additional viewpoint in his commentary on the commonalities and differences between the epistemic communities approach and negotiation analysis.

While all of the case studies in this volume consider the array of political and systemic constraints within which expert communities operate, Ikenberry focuses in particular on how political factors can impede the application of the consensual views of specialists. In his analysis of postwar economic management, he thus offers a limiting case, indicating that epistemic agreement was possible only in those areas removed from the political whirl. One of the

TABLE 1. *Approaches to the study of policy change*

<i>Approach</i>	<i>Level of analysis and area of study</i>	<i>Factors that influence policy change</i>	<i>Mechanisms and effects of change</i>	<i>Primary actors</i>
Epistemic communities approach	Transnational; state administrators and international institutions.	Knowledge; causal and principled beliefs.	Diffusion of information and learning; shifts in the patterns of decision making.	Epistemic communities; individual states.
Neorealist approaches ^a	International; states in political and economic systems.	Distribution of capabilities; distribution of costs and benefits from actions.	Technological change and war; shifts in the available power resources of states and in the nature of the game.	States.
Dependency theory-based approaches ^b	International; global system.	Comparative advantage of states in the global division of labor; control over economic resources.	Changes in production; shifts in the location of states in the global division of labor.	States in the core, periphery, and semiperiphery; multinational corporations.
Poststructuralist approaches ^c	International; discourse and language.	Usage and meanings of words.	Discourse; the opening of new political spaces and opportunities.	Unclear.

^aFor examples, see Robert Gilpin, *War and Change in World Politics* (Cambridge: Cambridge University Press, 1981); Stephen D. Krasner, *Structural Conflict* (Berkeley: University of California Press, 1985); and Kenneth N. Waltz, *Theory of International Politics* (Reading, Mass.: Addison-Wesley, 1979).

^bFor examples, see Fernando Henrique Cardoso and Enzo Faletto, *Dependency and Development in Latin America* (Berkeley: University of California Press, 1979); Peter Evans, *Dependent Development* (Princeton, N.J.: Princeton University Press, 1979); Peter Evans, "Declining Hegemony and Assertive Industrialization," *International Organization* 43 (Spring 1989), pp. 207-38; Johan Galtung, *The True Worlds* (New York: Free Press, 1984); and Immanuel Wallerstein, *The Capitalist World Economy* (Cambridge: Cambridge University Press, 1979).

^cFor examples, see James Der Derian and Michael J. Shapiro, eds., *International/Intertextual Relations* (Lexington, Mass.: Lexington Books, 1989); and Richard K. Ashley and R. B. J. Walker, eds., "Speaking the Language of Exile Dissidence in International Studies," special issue of *International Studies Quarterly*, vol. 34, no. 3, September 1990.

conclusions that can be drawn from Ikenberry's study, as well as from earlier studies of epistemic-like communities presented elsewhere,⁶ is that while the form of specific policy choices is influenced by transnational knowledge-based networks, the extent to which state behavior reflects the preferences of these networks remains strongly conditioned by the distribution of power internationally. Thus, the range of impact that we might expect of epistemic and epistemic-like communities remains conditioned and bounded by international and national structural realities. The extent of that conditioning—the amount of flexibility in the international system available for reflection and understanding in the face of power and structure—is the focus of this volume.

The international setting for epistemic communities

The modern administrative state: expansion, professionalization, and deference to the "knowledge elite"

Many of the major dimensions of contemporary international relations can be traced to the late nineteenth century, when crafts and guilds were declining

6. A number of earlier studies focusing on the interplay between expertise, technical issues, consensual knowledge, and state power have considered the role of epistemic-like communities in the decision-making process. At the level of international organizations, such studies have been undertaken with regard to wide variety of issue-areas and have demonstrated that webs of nonstate actors provided information and were involved in the shaping of agendas and the defining of state interests. While all of these studies cannot be listed here, a few examples show the range of areas analyzed: Robert W. Russell, "Transgovernmental Interaction in the International Monetary System, 1960-1972," *International Organization* 27 (Autumn 1973), pp. 431-64; William Ascher, "New Development Approaches and the Adaptability of International Agencies: The Case of the World Bank," *International Organization* 37 (Summer 1983), pp. 415-39; Barbara B. Crane and Jason L. Finkle, "Population Policy and World Politics," paper presented at the Fourteenth World Congress of the International Political Science Association, Washington, D.C., 28 August to 1 September 1988; Peter M. Haas, *Saving the Mediterranean: The Politics of International Environmental Protection* (New York: Columbia University Press, 1990); Barbara Johnson, "Technocrats and the Management of International Fisheries," *International Organization* 29 (Summer 1975), pp. 745-70; and Warren S. Wooster, "Interactions Between Intergovernmental and Scientific Organizations in Marine Affairs," *International Organization* 27 (Winter 1973), pp. 103-13. For examples of studies in comparative politics that discuss the role of epistemic-like communities in the development and enforcement of common policies, see Margaret Weir and Theda Skocpol, "State Structures and the Possibilities for 'Keynesian' Responses to the Great Depression in Sweden, Britain, and the United States," in Evans, Rueschemeyer, and Skocpol, *Bringing the State Back In*, pp. 107-68; Peter A. Hall, *Governing the Economy* (Cambridge: Polity Press, 1986), pp. 275 ff.; and Anthony King, "Ideas, Institutions, and Policies of Governments: A Comparative Analysis" (in 3 parts), *British Journal of Political Science* 3 (July and October 1973), pp. 291-313 and 409-23. With respect to policy coordination, it is worth stressing that even if actors believe that their common understandings will contribute to enhancing the collective good, serious unanticipated consequences are possible; see Stephen Van Evera, "Cult of the Offensive and the Origins of the First World War," *International Security* 9 (Summer 1984), pp. 58-107. For examples of purely national studies that discuss the role of epistemic-like communities in transforming state preferences, see John Odell, *U.S. International Monetary Policy* (Princeton, N.J.: Princeton University Press, 1982); Emanuel Adler, "Brazil's Domestic Computer Industry," *International Organization* 40 (Summer 1986), pp. 673-705; and Dennis Hodgson, "Orthodoxy and Revisionism in American Demography," *Population and Development Review* 14 (December 1988), pp. 541-69.

and scientific and engineering expertise were increasingly applied to commercial research, development, and governance.⁷ Scientific rationality began to prevail over alternative paradigms of knowledge as a model for decision-making science as well, although it did not reach its peak until about fifty years later, when logical positivism and the ideas of the Vienna Circle were embraced and the entry of white-coated professionals into the public policy process became more widespread. As Harvey Brooks observed in 1965, “Much of the history of social progress in the Twentieth Century can be described in terms of the transfer of wider and wider areas of public policy from politics to expertise.”⁸ With the proliferation of government ministries and agencies to coordinate and handle many new tasks, regulation has become an increasingly important bureaucratic function,⁹ and the expertise required has extended to a wider range of disciplines than ever before.

The domain of public governance has also grown correspondingly technical. Despite the fact that numerous ministries established for conducting War World II were decommissioned in subsequent years, the total number of ministries tripled during the period from the late 1940s to the mid-1970s. Around 1950, there were 70 independent countries with 850 ministries, or roughly 12 ministries per country. By 1975, there were 140 independent countries with 2,500 ministries, or nearly 18 ministries per country, indicating a strong shift toward more active social regulation.¹⁰ The rapid growth of government agencies was particularly evident in the United States, where two economic regulatory agencies and five major social regulatory agencies were

7. While the transfer of authority to the sphere of the secular and the rational can be traced back to the eighteenth century and the granting of Noblesse de la Robe in France, the integration of scientists and engineers into a new rationalized corporate structure really began with the second industrial revolution of the 1880s. For background information, see Franklin L. Ford, *Robe and Sword* (New York: Harper, 1953), pp. 248–52. Regarding the acceleration of technically grounded forms of governance and decision making, see David C. Mowery and Nathan Rosenberg, *Technology and the Pursuit of Economic Growth* (Cambridge: Cambridge University Press, 1989); JoAnne Yates, *Control Through Communication* (Baltimore, Md.: Johns Hopkins University Press, 1990); Alfred D. Chandler, *Strategy and Structure: Chapters in the History of the American Industrial Enterprise* (Garden City, N.Y.: Doubleday, 1966); Alfred D. Chandler, *The Visible Hand: The Managerial Revolution in American Business* (Cambridge, Mass.: Belknap Press, 1977); and A. Hunter Dupree, ed., *Science and the Emergence of Modern America, 1865–1916* (Chicago: Rand McNally, 1963).

8. Harvey Brooks, “Scientific Concepts and Cultural Change,” *Daedalus* 94 (Winter 1965), p. 68.

9. See Ezra N. Suleiman, ed., *Bureaucrats and Policy Making: A Comparative Overview* (New York: Holmes & Meier, 1984); Joel D. Aberbach, Robert D. Putnam, and Bert A. Rockman, *Bureaucrats and Politicians in Western Democracies* (Cambridge, Mass.: Harvard University Press, 1981); James Q. Wilson, ed., *The Politics of Regulation* (New York: Basic Books, 1980); and Terry M. Moe, “The Politics of Bureaucratic Structure,” in John E. Chubb and Paul E. Patterson, eds., *Can the Government Govern?* (Washington, D.C.: Brookings Institution, 1989), pp. 267–328.

10. See Jean Blondell, *The Organization of Governments* (Beverly Hills, Calif.: Sage, 1982), pp. 195–96. For data on the professional backgrounds of ministers and individuals occupying other ministerial posts, see Jean Blondell, *Government Ministers in the Contemporary World* (Beverly Hills, Calif.: Sage, 1982). Blondell notes that 9.5 percent of the ministers serving between 1945 and 1981 could be considered “specialists,” with most of this group consisting of civil engineers, electrical engineers, and agronomists.

created during the five-year period from 1970 to 1975, while the federal budget allocations for economic and social regulation grew by 157 percent and 193 percent, respectively.¹¹

Governments of industrialized countries also developed a greater interest in planning and began to establish futures-oriented research bodies.¹² With decolonization and the frequent emulation of the Western development models, the attitudes of these governments spread to those of the Third World as well.¹³ This was reflected, for example, in the fact that the governments of 118 countries established agencies responsible for environmental and natural resources between 1972 and 1982.

The process of professionalization accompanied the expansion of bureaucracies in many countries. In the United States, for example, the number of scientific and technical personnel employed by the federal government grew from 123,927 in 1954 to 189,491 in 1976 to 238,041 in 1983. This mere doubling of the number over nearly three decades obscures other pertinent changes in individual expertise in U.S. government employees. From 1973 to 1983 alone, the proportion of scientists and engineers with doctoral degrees grew by 51 percent, and the proportion with masters degrees grew by 44 percent. During the same period, the government was increasing its staff of scientists, engineers, and computer specialists by 4 percent per year, while the increase for other personnel was only 2 percent per year. By 1983, scientists, engineers, and computer specialists comprised 15 percent of the government white-collar work force, in contrast to 13 percent in 1973 and in contrast to 6 percent of the nongovernment work force in 1983.¹⁴

11. See Giandomenico Majone, "Regulatory Policies in Transition," *Jahrbuch für neue politische Ökonomie* (Tübingen: J. C. B. Mohr, 1984), p. 158. For discussions of the progressive expansion and professionalization of bureaucracies in the United States, see Stephen Skowronek, *Building a New American State: The Expansion of National Administrative Capacities, 1877-1920* (Cambridge: Cambridge University Press, 1982); Charles Maier, ed., *Changing Boundaries of the Political* (Cambridge: Cambridge University Press, 1987); Louis Galambos, ed., *The New American State: Bureaucracies and Policies Since World War II* (Baltimore, Md.: Johns Hopkins University Press, 1987); Bruce L. R. Smith, *American Science Policy Since World War II* (Washington, D.C.: Brookings Institution, 1990), pp. 28-35; Robert Gilpin and Christopher Wright, eds., *Scientists and National Policy Making* (New York: Columbia University Press, 1964); and George Kistiakowsky, *A Scientist at the White House* (Cambridge, Mass.: Harvard University Press, 1976).

12. Yehezkel Dror, *Policymaking Under Adversity* (New Brunswick, N.J.: Transaction Books, 1986).

13. Jawaharlal Nehru, arguing that less developed countries must also turn toward science, offered the following rationale: "It is science alone that can solve the problems of hunger and poverty, of insanitation and illiteracy, of superstition and deadening custom and tradition, of vast resources running to waste, of a rich country inhabited by starving people. . . . Who indeed could afford to ignore science today? At every turn we have to seek its aid. . . . The future belongs to science and those who make friends with science." Nehru is quoted by Max F. Perutz in *Is Science Necessary?* (New York: E. P. Dutton, 1989), p. vii.

14. See National Science Foundation, *Federal Scientific and Technical Workers: Numbers and Characteristics, 1973 and 1983* (Washington, D.C.: National Science Foundation, 1985), pp. 1-2. During the period from 1973 to 1978, the increase in scientists, engineers, and computer specialists occurred largely outside the Defense Department.

These trends contributed to the emergence of what Dorothy Nelkin has called “the policy role of the knowledge elite.”¹⁵ The proliferation of new agencies and the practice of staffing them with professionals also contributed to the erosion of centralized control over public bureaucracies, which has occurred despite widespread efforts since World War II to curb the discretion of bureaucratic administrators. As Joel Aberbach, Robert Putnam, and Bert Rockman found in their survey of public servants in the major Western industrialized societies, the overwhelming majority of civil servants regard themselves as technicians, policymakers, and brokers, unlike elected officials, who primarily regard themselves as advocates and partisans.¹⁶ In the case of professionals, the degree to which they are sympathetic with the missions of the agencies in which they work is influenced by a variety of factors, including the extent of their specialized training, the field in which they were trained, and their personal views.¹⁷ In other words, “where they stand” is associated with factors other than “where they sit.”

In international bureaucracies, such as the United Nations (UN), technical responsibilities have proliferated since the inauguration of the International Geophysical Year in 1957, yet the training of personnel within the UN system has not kept pace. Only 13 percent of the staff members have doctorates, and less than 50 percent hold more than a first university degree.¹⁸ In 1986, when the UN employed 54,000 people worldwide, about 18,000 were serving “professional” functions, 4,000 to 5,000 of which were “substantive” in nature.¹⁹ Nevertheless, the budgeting of funds in the UN indicates a shift away from the more traditional political and security considerations of the General Assembly and toward the more technical concerns of specialized agencies.²⁰

15. See Dorothy Nelkin, “Scientific Knowledge, Public Policy, and Democracy,” *Knowledge Creation, Diffusion, Utilization* 1 (September 1979), p. 107. See also Dorothy Nelkin, “The Political Impact of Technical Expertise,” *Social Studies of Science* 5 (February 1975), pp. 35–54. For a critical view of the role of scientists in decision making, see Joel Primack and Frank Von Hippel, *Advice and Dissent* (New York: Basic Books, 1974).

16. See Aberbach, Putnam, and Rockman, *Bureaucrats and Politicians in Western Democracies*.

17. See Samuel P. Hays, *Beauty, Health, and Permanence: Environmental Politics in the United States, 1955–1985* (Cambridge: Cambridge University Press, 1987), pp. 357–59; William T. Gormley, Jr., “Professionalism Within Environmental Bureaucracies: The Policy Implications of Personnel Choices,” La Follette Institute of Public Affairs, occasional paper no. 1, Madison, Wisc., December 1986; and Thomas M. Dietz and Robert Rycroft, *The Risk Professionals* (New York: Russell Sage, 1987).

18. See Peter Fromuth and Ruth Raymond, “U.N. Personnel Policy Issues,” in *United Nations Management and Decision-Making Project* (New York: United Nations, 1987), p. 13. See also Douglas Williams, *The Specialized Agencies and the United Nations* (London: C. Hurst, 1987), p. 254.

19. See Anthony Mango, “The Role of Secretariats of International Institutions,” in Paul Taylor and A. J. R. Groom, eds., *International Institutions at Work* (New York: St. Martin’s Press, 1986), pp. 40–43. Based on his survey of 75 percent of the UN’s professional staff, Mango concluded that about 4,000 served key functions “in all areas of human endeavor from peace and disarmament to health, nutrition, industry, communications, and the environment.” Thus, for the full 100 percent of the staff, the figure may have reached 5,000.

20. The percentage of the UN budget allocated for specialized agencies steadily rose from 45.1 percent in 1950 to 60.5 percent in 1985. With the adoption of the Kaesebaum amendment, the percentage has remained at the 1985 level. Two specialized areas involving science and

Thus, the expansion and professionalization of bureaucracies and the growing technical nature of problems have fostered an increase in the deference paid to technical expertise and, in particular, to that of scientists. "In modern societies," Barry Barnes and David Edge have argued, "science is near to being *the* source of cognitive authority: anyone who would be widely believed and trusted as an interpreter of nature needs a license from the scientific community."²¹

As several studies have pointed out, policymakers and leaders typically expect to remain in control even when delegating authority.²² Questions arise, then, about the effects that the interaction of experts and politicians have on policy choices. Many expected that scientists, because of their common faith in the scientific method, would make policymaking more rational. Yet even in cases involving what is regarded as a technical issue, policymaking decisions generally involve the weighing of a number of complex and nontechnical issues centering around who is to get what in society and at what cost. Despite the veneer of objectivity and value neutrality achieved by pointing to the input of scientists, policy choices remain highly political in their allocative consequences.²³ Especially in cases in which scientific evidence is ambiguous and the experts themselves are split into contending factions, issues have tended to be resolved less on their technical merits than on their political ones. That scientists working within the bureaucracy have a common faith in the scientific method does not guarantee their solidarity, nor does it make them immune to pressures from the institutions in which they work or from political temptation.

Studies of science policy and of scientists' effects on American policy and regulation have been at best equivocal, finding only slight and transitory

technology—that of food and agriculture and that of health—have come to control over 25 percent of the resources of the UN system. See UN document nos. A/1312, A/3023, A/6122, A/7608, A/42/683, and A/10360, UN, New York, 1951, 1956, 1967, 1971, 1976, and 1986, respectively. The highest postwar rates of growth for new international scientific and professional associations (ISPAs) was also in the areas of science and technology, followed by economics and finance. See Diana Crane, "Alternative Models of ISPAs," in William M. Evan, ed., *Knowledge and Power in a Global Society* (Beverly Hills, Calif.: Sage, 1981), p. 30; and Werner Feld, "Nongovernmental Entities and the International System," *Orbis* 15 (Fall 1971), pp. 879–922.

21. See Barry Barnes and David Edge, "General Introduction," in Barry Barnes and David Edge, eds., *Science in Context* (Cambridge, Mass.: MIT Press, 1982), p. 2. For an argument that the influence of scientific specialists often extends to areas beyond their formal training, see Alvin M. Weinberg, "Science and Trans-Science," *Minerva* 10 (April 1972), pp. 209–22.

22. See Terry M. Moe, "The New Economics of Organization," *American Journal of Political Science* 28 (November 1984), pp. 739–77; and Jonathan Bendor, Serge Taylor, and Roland Van Gaalen, "Stacking the Deck: Bureaucratic Missions and Policy Design," *American Political Science Review* 81 (September 1987), pp. 873–96.

23. See Yaron Ezrahi, "Utopian and Pragmatic Rationalism: The Political Context of Scientific Advice," *Minerva* 18 (Spring 1980), pp. 111–31; Robert F. Rich, "The Pursuit of Knowledge," *Knowledge Creation, Diffusion, Utilization* 1 (September 1979), pp. 6–30; Robert H. Socolow, "Failures of Discourse," in Harold A. Feiveson, Frank W. Sinden, and Robert H. Socolow, eds., *Boundaries of Analysis* (Cambridge, Mass.: Ballinger, 1976); and Peter deLeon, *Advice and Consent: The Development of the Policy Sciences* (New York: Russell Sage, 1988).

influence by scientists.²⁴ Similarly, early studies of policy coordination in technical areas have demonstrated that state decision makers were no more willing to sacrifice autonomy in these areas than in issues of security; that as their governments grew cognizant of the political costs of technical coordination, they grew more unwilling to coordinate their actions; and that many foreign ministries proved resistant to any encroachment by technical functional ministries on their sphere of responsibility.²⁵ Thus, in spite of the increasing involvement of technocrats in government institutions and contrary to the hopes of functionalists such as David Mitrany, outcomes in technical issues proved little different from those of more conventional high politics.

Unlike the functionalists, who turned their attention to the development of common activities and the transfer of technocratic loyalty to a superordinate authority, the concern of the contributors to this volume is with styles of policymaking and changes in the patterns of policymakers' reasoning. As argued below, the increasing uncertainties associated with many modern responsibilities of international governance have led policymakers to turn to new and different channels of advice, often with the result that international policy coordination is enhanced.

Decision-making processes: complexity, uncertainty, and the turn to epistemic communities for advice

Among the factors that have contributed to the uncertainties faced by decision makers are the increasingly complex and technical nature of the ever-widening range of issues considered on the international agenda, including monetary, macroeconomic, technological, environmental, health, and population issues; the growth in the complexity of the international political system in terms of the number of actors and the extent of interactions; and the expansion of the global economy and the modern administrative state.²⁶ Forced

24. See Dorothy Nelkin, ed., *Controversy: Politics of Technical Decisions* (Beverly Hills, Calif.: Sage, 1979); Michael Mulkay, *Science and the Sociology of Knowledge* (London: Allen & Unwin, 1979); William Kornhauser, *Scientists in Industry* (Berkeley: University of California Press, 1962); and Peter Weingart, "The Scientific Power Elite: A Chimera," in Norbert Elias, Herminio Martins, and Richard Whitley, eds., *Scientific Establishments and Hierarchies* (Dordrecht, Netherlands: Reidel, 1982), pp. 71–88.

25. See John G. Ruggie, "Collective Goods and Future International Collaboration," *American Political Science Review* 66 (September 1972), pp. 874–93; Henry R. Nau, *National Politics and International Technology* (Baltimore, Md.: Johns Hopkins University Press, 1974); and Roger Williams, *European Technology: The Politics of Cooperation* (New York: Wiley, 1974).

26. For discussions of these changes and the increasing social, economic, and political interdependence that accompanied them, see, for example, Todd R. La Porte, ed., *Organized Social Complexity* (Princeton, N.J.: Princeton University Press, 1975); Marion Levy, *Modernization and the Structure of Societies* (Princeton, N.J.: Princeton University Press, 1966); Alex Inkeles, "Emerging Social Structure of the World," *World Politics* 27 (July 1975), pp. 467–95; Karl Polyani, *The Great Transformation* (Boston: Beacon Press, 1944); Richard Cooper, *The Economics of Interdependence* (New York: McGraw-Hill, 1968); Robert O. Keohane and Joseph S. Nye, *Power and Interdependence: World Politics in Transition* (Boston: Little, Brown, 1977); Edward Morse, *Modernization and*

to deal with a broader range of issues than they were traditionally accustomed to, decision makers have turned to specialists to ameliorate the uncertainties and help them understand the current issues and anticipate future trends.²⁷

Complexity tests the limits of human understanding. Although knowledge may be better than it was in the past about the dynamics of any of the individual issues, the nature of the interactions between them is particularly difficult to grasp and deal with effectively in the policymaking process. For example, to the extent that economic interdependence and a globalized economy require policy coordination among countries to pursue domestic goals, the domestic agendas and international agendas have become increasingly linked, yet decision makers have often failed to comprehend the complex linkages. The result, as some analysts have complained, is that “to a far greater extent than in the past, the individuals who must make the difficult economic choices in Washington are in the dark.”²⁸

Similarly, in the case of international environmental issues, decision makers are seldom certain of the complex interplay of components of the ecosystem and are therefore unable to anticipate the long-term consequences of measures designed to address one of the many environmental issues under current consideration. Without the help of experts, they risk making choices that not only ignore the interlinkages with other issues but also highly discount the uncertain future, with the result that a policy choice made now might jeopardize future choices and threaten future generations.

Conditions of uncertainty, as characterized by Alexander George, are those under which actors must make choices without “adequate information about the situation at hand” or in the face of “the inadequacy of available general knowledge needed for assessing the expected outcomes of different courses of

the Transformation of International Relations (New York: Free Press, 1976); John G. Ruggie, “Continuity and Transformation in the World Polity,” *World Politics* 35 (January 1983), pp. 261–85; and Stephen Toulmin, *Cosmopolis: The Hidden Agenda of Modernization* (New York: Free Press, 1990). For discussions of increasing ecological interdependence, see W. C. Clark and R. E. Munn, eds., *Sustainable Development of the Biosphere* (Cambridge: Cambridge University Press, 1986); and Organization for Economic Cooperation and Development (OECD), *Economic and Ecological Interdependence* (Paris: OECD, 1982).

27. Regarding uncertainty and the turn to specialists for advice, see Dror, *Policymaking Under Adversity*, pp. 60–61; Harold Wilensky, *Organizational Intelligence* (New York: Basic Books, 1967); Guy Benveniste, *The Politics of Expertise* (San Francisco: Boyd & Fraser, 1977); William Ascher, “New Development Approaches and the Adaptability of International Agencies”; J. Hirschleifer and John G. Riley, “The Analytics of Uncertainty and Information: An Expository Survey,” *Journal of Economic Literature* 17 (December 1979), pp. 1375–1412; Geoffrey Brennan and James M. Buchanan, *The Reason of Rules* (Cambridge: Cambridge University Press, 1985), chap. 2; Zdenek J. Slouka, “International Law Making: A View from Technology,” in Nicholas Greenwood Onuf, ed., *Law Making in the Global Community* (Durham, N.C.: Carolina Academic Press, 1982), p. 149; Langdon Winner, “Complexity and the Limits of Human Understanding,” in La Porte, *Organized Social Complexity*, pp. 40–76; and Ina Spiegel-Rosing and Derek De Solla Price, eds., *Science, Technology and Society* (Beverly Hills, Calif.: Sage, 1977).

28. C. Michael Aho and Marc Levinson, *After Reagan: Confronting the Changed World Economy* (New York: Council on Foreign Relations, 1988), p. 8.

action.”²⁹ A growing number of issues and problems faced by decision makers fit this description. That this is true indeed undermines the utility of many conventional approaches to international relations, which presume that a state’s self-interests are clear and that the ways in which its interests may be most efficaciously pursued are equally clear.³⁰ As several authors have warned, however, misperceptions of the nature of the international setting, as well as misperceptions of others’ intentions and actions, are most likely to occur under conditions of uncertainty.³¹

Decision makers do not always recognize that their understanding of complex issues and linkages is limited, and it often takes a crisis or shock to overcome institutional inertia and habit and spur them to seek help from an epistemic community. In some cases, information generated by an epistemic community may in fact create a shock, as often occurs with scientific advances or reports that make their way into the news, simultaneously capturing the attention of the public and policymakers and pressuring them into action. In estimating the effect that shocks or crises have on decision makers, the contributors to this volume are influenced by two schools of thought. Those informed by organization theory presume that decision makers will seek information and defer to actors who are able to provide credible technical advice. Those applying the political literature presume that leaders will only defer to technical advice that will enable them to pursue preexisting ends and to expand political coalitions. This does not, however, rule out the possibility that leaders would defer to specialists under circumstances in which they are uncertain about what course of action is in their own political interests, nor does it exclude the possibility that their delegation of authority will persist past the initial crisis or shock.

The concept of uncertainty is thus important in our analysis for two reasons. First, in the face of uncertainty, and more so in the wake of a shock or crisis, many of the conditions facilitating a focus on power are absent. It is difficult for leaders to identify their potential political allies and to be sure of what strategies are most likely to help them retain power. And, second, poorly understood conditions may create enough turbulence that established operating procedures may break down, making institutions unworkable. Neither power nor institutional cues to behavior will be available, and new patterns of action may ensue.

29. Alexander George, *Presidential Decision Making in Foreign Policy: The Effective Use of Information and Advice* (Boulder, Colo.: Westview Press, 1980), pp. 26–27.

30. Armen A. Alchian, “Uncertainty, Evolution, and Economic Theory,” *Journal of Political Economy*, vol. 58, 1950, pp. 211–21.

31. See Arthur A. Stein, *Why Nations Cooperate* (Ithaca, N.Y.: Cornell University Press, 1990), chap. 3; Robert Jervis, *Perception and Misperception in International Politics* (Princeton, N.J.: Princeton University Press, 1976); Glenn H. Snyder and Paul Diesing, *Conflict Among Nations* (Princeton, N.J.: Princeton University Press, 1977); and Yaacov Y. I. Vertzberger, *The World in Their Minds* (Stanford, Calif.: Stanford University Press, 1990).

Under conditions of uncertainty, then, decision makers have a variety of incentives and reasons for consulting epistemic communities,³² some of them more politically motivated than others. First, following a shock or crisis, epistemic communities can elucidate the cause-and-effect relationships and provide advice about the likely results of various courses of action. In some cases, they can help decision makers gain a sense of who the winners and losers would be as the result of a particular action or event, as was the case in considerations about banning chlorofluorocarbon use or facing a possible environmental disaster. Decision makers seldom apply the types of decision-making heuristics that scientists apply under conditions of uncertainty.³³ Indeed, as Jon Elster argues, decision makers generally “are unable to assign numerical probabilities to the various answers of what will happen. They can at most list the possible answers, not estimate their probabilities.”³⁴ While they may desire probability statistics and similar data for purposes of determining the gravity of a situation, they may also use the information for other purposes, such as justifying a “wait and watch” policy and deferring responsibility until the future, when other actors may be held responsible.

Second, epistemic communities can shed light on the nature of the complex interlinkages between issues and on the chain of events that might proceed either from failure to take action or from instituting a particular policy. Information is at a premium in the face of possible systemic volatility, when efforts to solve or curb a problem in one domain or issue-area may have unanticipated negative feedback effects on others.

Third, epistemic communities can help define the self-interests of a state or factions within it. The process of elucidating the cause-and-effect relationships of problems can in fact lead to the redefinition of preconceived interests or to the identification of new interests.

Fourth, epistemic communities can help formulate policies. Their role in this regard will depend on the reasons for which their advice is sought. In some cases, decision makers will seek advice to gain information which will justify or legitimate a policy that they wish to pursue for political ends. An epistemic community’s efforts might thus be limited to working out the details of the policy, helping decision makers anticipate the conflicts of interest that would emerge with respect to particular points, and then building coalitions in support of the policy. If the policy is instituted and problems ensue, the decision makers have the option of pointing to the information given to them by

32. In *Markets and Hierarchies* (New York: Free Press, 1975), Oliver Williamson argues that under conditions of uncertainty, organizations are likely to develop internal methods to generate more and better information instead of turning to external sources.

33. See Daniel Kahneman, Paul Slovic, and Amos Tversky, eds., *Judgement Under Uncertainty: Heuristics and Biases* (Cambridge: Cambridge University Press, 1982).

34. See Jon Elster, *Explaining Technical Change* (Cambridge: Cambridge University Press, 1983), p. 185. See also John D. Steinbruner, *The Cybernetic Theory of Decision* (Princeton, N.J.: Princeton University Press, 1974), pp. 17–18; and Herbert Simon, “Rationality as Process and as Product of Thought,” *American Economic Review* 68 (May 1978), pp. 1–16.

experts and spreading the blame.³⁵ Again, however, it is important to stress that epistemic communities called in for political reasons may succeed in imposing their views and moving toward goals other than those initially envisioned by the decision makers.

In less politically motivated cases, epistemic communities have a greater hand in the various stages of the policymaking process, including the introduction of policy alternatives, the selection of policies, and the building of national and international coalitions in support of the policies. "The definition of the alternatives," as E. E. Schattschneider noted, "is the supreme instrument of power."³⁶ By pointing out which alternatives are not viable on the basis of their causal understanding of the problems to be addressed, the community members can limit the range of alternatives under consideration. While the actual choice of policies remains the domain of the decision makers, it can also be influenced by community members. As Herbert Simon points out, almost all organizations engage in some form of "satisficing" or procedural rationality in their consideration of policy alternatives.³⁷ If rationality is bounded, epistemic communities may be responsible for circumscribing the boundaries and delimiting the options.

Distinguishing epistemic communities from other groups

As outlined earlier, members of epistemic communities not only hold in common a set of principled and causal beliefs but also have shared notions of validity and a shared policy enterprise. Their authoritative claim to policy-relevant knowledge in a particular domain is based on their recognized expertise within that domain. These features distinguish epistemic communities from other groups often involved in policy coordination.

Epistemic communities need not be made up of natural scientists; they can consist of social scientists or individuals from any discipline or profession who have a sufficiently strong claim to a body of knowledge that is valued by society. Nor need an epistemic community's causal beliefs and notions of validity be based on the methodology employed in the natural sciences; they can originate from shared knowledge about the nature of social or other processes, based on analytic methods or techniques deemed appropriate to the disciplines or professions they pursue. In this volume of articles, for example, while the community involved in efforts to protect the ozone layer claimed authority

35. See Lauriston R. King and Philip H. Melanson, "Knowledge and Politics: Some Experiences from the 1960s," *Public Policy* 20 (Winter 1972), p. 84. For similar observations, see Martin L. Perl, "The Scientific Advisory System: Some Observations," *Science* 173 (September 1971), pp. 1211–15.

36. E. E. Schattschneider, *The Semisovereign People* (Hinsdale, Ill.: Dryden Press, 1975), p. 66.

37. See the following works by Herbert A. Simon: *Reason in Human Affairs* (Stanford, Calif.: Stanford University Press, 1983); and "Human Nature in Politics: The Dialogue of Psychology with Political Science," *The American Political Science Review* 79 (June 1985), pp. 293–304.

based on knowledge about atmospheric science, communities involved in other efforts had expertise related to disciplines and professions such as economics and engineering.

While national epistemic communities may emerge and direct their activities largely toward a single country, as in the case of the U.S. community and the Soviet community described by Adler, they may in some cases become transnational over time as a result of the diffusion of community ideas through conferences, journals, research collaboration, and a variety of informal communications and contacts. But epistemic communities need not be transnational, nor need their members meet regularly in a formal manner. Collaboration in the absence of material interests binding together actors in different countries with common policy agendas would strongly suggest the existence of an epistemic community with transnational membership. A transnational community's ideas may take root in an international organization or in various state bodies, after which they are diffused to other states via the decision makers who have been influenced by the ideas. As a result, the community can have a systemic impact. Because of its larger diffusion network, a transnational community's influence is likely to be much more sustained and intense than that of a national community.

The epistemic community members' professional training, prestige, and reputation for expertise in an area highly valued by society or elite decision makers accord them access to the political system and legitimize or authorize their activities. Similarly, their claims to knowledge, supported by tests of validity, accord them influence over policy debates and serve as their primary social power resource.³⁸ At the same time, the professional pedigrees and validity tests set the community members apart from other social actors or groups³⁹ and not only serve as a barrier to their entry into the community but also limit the influence that these other actors or groups might have in the

38. See Wolfgang Schluchter, "Modes of Authority and Democratic Control," in Volker Meja, Dieter Misgeld, and Nico Stehr, eds., *Modern German Sociology* (New York: Columbia University Press, 1987), p. 297. "It seems that in the case of functional authority," writes Schluchter, "it is the 'trust' institutionalized in the internal relations between 'experts' that communicates to outsiders faith in the value of specialized knowledge."

39. According to the definition of epistemic communities employed in this volume, community members have intersubjective, internally defined validity tests. This contrasts with Ernst Haas's usage of the concept of epistemic communities, in which he explicitly mentions that such communities "profess beliefs in extracommunity reality tests." See Ernst B. Haas, *When Knowledge Is Power* (Berkeley: University of California Press, 1990), p. 41. Although there are other differences between his and our usage, they are fairly minor. I believe that this particular difference in emphasis on intracommunity versus extracommunity truth tests springs primarily from differing overarching historical visions. Ernst Haas seeks to demonstrate the evolution of rationality over time, possibly through the gradual intercession of epistemic communities into collective decision making. For such a normative claim to be sustained, the epistemic community must share a common basis for validation of its understanding with the broader policy community. Conversely, I am much more skeptical about such universal validity claims and am content to settle for the less ambitious internal truth tests. While in most cases members outside the epistemic community may concur that validity claims exist, it is less clear that they would be able to identify or evaluate them.

		Causal beliefs	
		<i>Shared</i>	<i>Unshared</i>
Principled beliefs	<i>Shared</i>	Epistemic communities	Interest groups and social movements
	<i>Unshared</i>	Disciplines and professions	Legislators, bureaucratic agencies, and bureaucratic coalitions

		Knowledge base	
		<i>Consensual</i>	<i>Disputed or absent</i>
Interests	<i>Shared</i>	Epistemic communities	Interest groups, social movements, and bureaucratic coalitions
	<i>Unshared</i>	Disciplines and professions	Legislators and bureaucratic agencies

FIGURE 1. *Distinguishing epistemic communities from other groups*

policy debate. In response to new information generated in their domain of expertise, epistemic community members may still engage in internal and often intense debates leading to a refinement of their ideas and the generation of a new consensus about the knowledge base.

As Figure 1 indicates, it is the combination of having a shared set of causal and principled (analytic and normative) beliefs, a consensual knowledge base, and a common policy enterprise (common interests) that distinguishes epistemic communities from various other groups. They differ from interest groups in that the epistemic community members have shared causal beliefs and cause-and-effect understandings. If confronted with anomalies that undermined their causal beliefs, they would withdraw from the policy debate, unlike interest groups. Peterson’s case regarding the management of whaling, for example, stresses the difference between the epistemic community of cetologists, the economic interest group of whaling industry managers, and the issue-oriented lobbying coalition of environmentalists.

Epistemic communities must also be distinguished from the broader scientific community as well as from professions and disciplines.⁴⁰ Although members of a given profession or discipline may share a set of causal approaches or orientations and have a consensual knowledge base, they lack the shared normative commitments of members of an epistemic community. An epistemic community's ethical standards arise from its principled approach to the issue at hand, rather than from a professional code. Unlike members of a profession or discipline, who seldom limit themselves to work that is closely congruent with their principled values,⁴¹ members of an epistemic community tend to pursue activities that closely reflect the community's principled beliefs and tend to affiliate and identify themselves with groups that likewise reflect or seek to promote these beliefs. In practice, however, short-term alliances based on common research and concerns often exist between members of epistemic communities and professions.⁴²

The point to be stressed here is that while economists as a whole constitute a profession, members of a particular subgroup of economists—for example, Keynesians or followers of one of the schools of development economics—may constitute an epistemic community of their own and systematically contribute to a concrete set of projects informed by their preferred views, beliefs, and ideas.

The beliefs and goals of epistemic communities differ from those of bureaucratic bodies, but the approaches to analyzing epistemic communities and bureaucratic politics share a focus on administrative empowerment of specialized knowledge groups. Bureaucratic bodies operate largely to preserve their missions and budgets,⁴³ whereas epistemic communities apply their causal knowledge to a policy enterprise subject to their normative objectives. Consequently, although members of epistemic communities may use the bureaucratic leverage they are able to acquire through obtaining key personnel

40. According to A. M. Carr-Saunders, "What we now call a profession emerges when a number of persons are found to be practicing a definite technique founded upon specialized training." Carr-Saunders's classic formulation is cited by Howard M. Vollmer and Donald L. Mills in *Professionalization* (Englewood Cliffs, N.J.: Prentice-Hall, 1966), p. 3. Subsequent sociologists have formulated a fuller definition that includes a reputation for authority, society's sanction, barriers to entry, a regulative code of conduct, and a service orientation. See Harold L. Wilensky, "The Professionalization of Everyone," *American Journal of Sociology* 70 (September 1964), pp. 137–58; and Schluchter, "Modes of Authority and Democratic Control."

41. See Charles Derber, William A. Schwartz, and Yale Magrass, *Power in the Highest Degree* (New York: Oxford University Press, 1990), p. 136.

42. This occurred in the context of efforts to control pollution in the Mediterranean, when several groups of natural scientists allied with the ecological epistemic community. While these scientists shared some of the causal beliefs and policy concerns of the epistemic community, they did not share its full array of normative and causal beliefs. See Peter M. Haas, "Do Regimes Matter? Epistemic Communities and Mediterranean Pollution Control," *International Organization* 43 (Summer 1989), pp. 386–87.

43. See Graham T. Allison, *Essence of Decision* (Boston: Little, Brown, 1971); and Robert J. Art, "Bureaucratic Politics and American Foreign Policy," *Policy Sciences* 4 (December 1973), pp. 467–90.

slots within bureaucracies, their behavior is different from that of the individuals typically analyzed in terms of their bureaucratic constraints. Such a normative component means that epistemic community members are not merely policy entrepreneurs.

Because the behavior within and by an epistemic community is guided by various kinds of normative and causal beliefs as well as circumstance, it will differ from the behavior typically analyzed and predicted by rational choice theorists and principal-agent theorists. The combination of shared causal beliefs and shared principled beliefs held by epistemic community members would inform the advice they offer and would offset or outweigh the pressures for them to offer alternative advice which is more consistent with the preexisting political interests or preferences of high-level policymakers or which might further their individual careers.⁴⁴ Sociologist Joseph Ben-David, writing about scientific communities with tightly shared beliefs, notes that they provide “an example of an extreme case of effective social control by a minimum of informal sanctions” and demonstrate “one of the interesting instances where a group of people is held together by a common purpose and shared norms without the need of reinforcement by familial, ecological, or political ties.”⁴⁵

The solidarity of epistemic community members derives not only from their shared interests, which are based on cosmopolitan beliefs of promoting collective betterment, but also from their shared aversions, which are based on their reluctance to deal with policy agendas outside their common policy enterprise or invoke policies based on explanations that they do not accept. The members’ institutional ties, informal networks, and collective political practices also contribute to the persistence and solidarity of the community in several ways. They provide members with a valuable institutional structure in which to compare information and to find moral support for their sometimes socially and politically marginalized beliefs. They also strengthen the commitments of individuals and inhibit them from subsequently recanting the beliefs shared with and reinforced by their fellow community members.

Cognate literature

Numerous bodies of literature shed light on the three major dynamics—uncertainty, interpretation, and institutionalization—that are explored in the epistemic communities approach to the study of international policy coordination presented here. Insights gained from work in various disciplines appear to support our arguments that epistemic communities are not epiphenomenal;

44. See Michael Hechter, *Principles of Group Solidarity* (Berkeley: University of California Press, 1987); and Mancur Olson, *The Logic of Collective Action* (Cambridge, Mass.: Harvard University Press, 1965).

45. Joseph Ben-David, *The Scientist's Role in Society* (Chicago: University of Chicago Press, 1984), pp. 5–6.

that policy is not merely determined by a consistent set of deeper economic, political, or social structures that in some way generate a preconditioned set of outcomes; and that while some political and social conditions surely penetrate all technical advice and the outlooks of specialists, all specialists are not subject to the same set of conditioning forces. While international relations scholars have introduced many variables and concepts to help us understand policy outcomes and coordination (see Table 2), we argue that epistemic communities, as objects of study, are distinct from these concepts in that they may convey new patterns of reasoning to decision makers and encourage them to pursue new paths of policymaking, which may in turn lead to unpredicted or unpredictable outcomes.

Reality is socially constructed.

Decision makers are most likely to turn to epistemic communities under conditions of uncertainty. While their goal is ostensibly to obtain “knowledge” that will ameliorate the uncertainty and give them some handle on the “reality” or “truth” of the situation at hand, the specialists called upon for advice bring with them their interpretations of the knowledge, which are in turn based on their causally informed vision of reality and their notions of validity.

As numerous social and cultural theorists have argued, reality is socially constructed. Epistemologically, the world and our representation of it are not isomorphic; our concept of reality is mediated by prior assumptions, expectations, and experience.⁴⁶ Even knowledge “cannot mean the ‘grasping’ of reality itself,” Burkhard Holzner and John Marx argue. “In fact,” they add, “philosophical progress has produced the conclusive insight that there can be no such thing as the direct and ‘true’ apprehension of ‘reality’ itself. More strictly speaking, we are compelled to define ‘knowledge’ as the communicable mapping of some aspect of experienced reality by an observer in symbolic terms.”⁴⁷

In a similar vein, philosophers and sociologists of science have pointed to the epistemological difficulty of verifying our collective visions of the world. Radical constructivists, for example, contend that since the very language we use to describe the world is socially constructed, there is no “objective” basis for identifying material reality and all claims for objectivity are therefore suspect.⁴⁸ In other words, subject and object are mutually constitutive; no

46. See Peter L. Berger and Thomas Luckman, *The Social Construction of Reality* (Garden City, N.Y.: Doubleday Anchor, 1967). See also Stephen Toulmin, ed., *Physical Reality* (New York: Harper & Row, 1970). Toulmin’s book includes a turn-of-the-century exchange between Max Planck and Ernst Mach regarding whether quantum mechanics occurs in the mind or in the world.

47. Holzner and Marx, *Knowledge Application*, p. 93.

48. See Steve Woolgar, *Science: The Very Idea* (London: Tavistock, 1988); and Karin D. Knorr-Cetina and Michael Mulkay, eds., *Science Observed: Perspectives on the Social Study of Science* (London: Sage, 1983). For a balanced presentation of the radical and more moderate constructivist views, see M. Hollis and S. Lukes, eds., *Rationality and Relativism* (Cambridge, Mass.: MIT Press, 1982).

TABLE 2. *Variables discussed in the literature on policy coordination*

<i>Variable</i>	<i>Defining characteristics of variable</i>				<i>Explanatory implications of variable</i>	
	<i>Principled beliefs</i>		<i>Causal beliefs</i>	<i>Validity tests</i>		<i>Policy enterprise</i>
Epistemic communities	x		x	x	x	Policy coordination reflects epistemic community-induced changes in state interests and patterns of decision making.
Ideas	x	or	x			Policy coordination reflects the substance of ideas.
Belief systems, operational codes, and cognitive maps	x	or	x			Belief systems orient behavior and shape perceptions.
Consensual knowledge			x	x		Policy coordination reflects consensual knowledge.
Policy networks			x		x	Policy outcomes reflect the collusion of interested parties.
Transnational and trans-governmental channels and politics					x	Information is diffused and political alliances are forged via functional transnational and transgovernmental channels.
Institutions and organizations					x	Policy outcomes reflect historically inherited preferences and styles.

description can exist independently of the social circumstances under which that description is made. Science, they argue, is no different from any other form of knowledge creation, and there is no basis for privileging “scientific” knowledge.

Alternatively, those with a more essentialist or materialist view argue that the world is a real and separate object of inquiry that exists independently of the analyst and that although the categories in which it is identified are socially constructed, consensus about the nature of the world is possible in the long run. This limited constructivist view informs the analyses presented by most of the authors contributing to this volume. It also has implications for evaluating the validity of a given body of knowledge, pointing to the need for a consensus theory of a finite and temporally bounded notion of truth, rather than a correspondence theory.⁴⁹ Although knowledge is only accepted belief, not correct belief, correct beliefs may evolve over time, as progressively more accurate characterizations of the world are consensually formulated.⁵⁰ By reference to internally formulated truth tests, contending groups may collectively validate their conclusions and their beliefs may converge intersubjectively in the medium run.

The epistemic communities approach focuses on this process through which consensus is reached within a given domain of expertise and through which the consensual knowledge is diffused to and carried forward by other actors. Its primary concern is the political influence that an epistemic community can have on collective policymaking, rather the correctness of the advice given. While epistemic communities provide consensual knowledge, they do not necessarily generate truth. The epistemological impossibility of confirming access to reality means that the group responsible for articulating the dimensions of reality has great social and political influence. It can identify and represent what is of public concern, particularly in cases in which the physical manifestations of a problem are themselves unclear, such as the case involving threats to the stratospheric ozone layer explored in this volume of articles.

Pursuing ontological lines of inquiry, some scholars in the fields of critical theory and the sociology of science have taken a more instrumental approach to analyzing how the nature of reality is elucidated by groups. Rather than addressing questions about contending individual access to reality, they have

49. See Joseph Rouse, *Knowledge and Power* (Ithaca, N.Y.: Cornell University Press, 1987); Richard Rorty, *Philosophy and the Mirror of Nature* (Princeton, N.J.: Princeton University Press, 1979); and Peter Munz, *Our Knowledge of the Growth of Knowledge* (London: Routledge & Kegan Paul, 1985).

50. See Donald T. Campbell, “Evolutionary Epistemology,” in P. A. Schilpp, ed., *The Philosophy of Karl Popper* (LaSalle, Ill.: Open Court Publishing, 1974), pp. 413–63; Donald T. Campbell and Bonnie T. Paller, “Extending Evolutionary Epistemology to ‘Justifying’ Scientific Beliefs,” in Kai Halweg and C. A. Hooker, eds., *Issues in Evolutionary Epistemology* (Albany: State University of New York Press, 1989), pp. 231–57; Stephen Toulmin, *Human Understanding: The Collective Use and Evolution of Concepts* (Princeton, N.J.: Princeton University Press, 1972); Larry Laudan, *Progress and Its Problems* (Berkeley: University of California Press, 1977); and Larry Laudan, *Science and Values* (Berkeley: University of California Press, 1984).

investigated the effects of specific social institutions on specialists' research. Specialists' choices of research programs, they argue, are influenced by a variety of factors, ranging from the predispositions of funding agencies and the possibilities for career advancement to the deeper social forces that identify fruitful research questions and facilitate their investigation while impeding the investigation of others.⁵¹ Moreover, scientists' observations are themselves the function of prior interests and are influenced by factors such as language usage.⁵² This is emphasized by Joseph Rouse, who argues that "scientific observation of the world is theoretically selected and interpreted and functions only within a network of presupposed theories. Observation is very far from giving us an independent check on the accuracy of our theoretical representations."⁵³ Technical advice that fixes attention on specific problems thus reflects more fundamental social and economic functional needs.

Many authors have been quick to point out that the increasing influence of specialized groups such as epistemic communities may have serious negative implications for such deep-seated political values as democracy and participation. The transfer of decision-making authority to a group of elite specialists, they argue, can further limit access to power by the public.⁵⁴ The Frankfurt school of scholars and many critics of modern society and technology, including Ivan Illich, Jacques Ellul, and Lewis Mumford, saw the turn to elite specialists as the first wave of the victory of instrumental reason over fundamental interests. Others have warned that privileging the advice of specialists in a particular domain, such as engineering, may result in the generation of "bad" decisions, either because it leads to a neglect of potentially valuable interdisciplinary insights or ignores the social ends to which decisions regarding specific issues are directed.⁵⁵

51. See Sylvia Noble Tesh, *Hidden Arguments: Political Ideology and Disease Prevention Policy* (New Brunswick, N.J.: Rutgers University Press, 1988); and Jürgen Habermas, *Knowledge and Human Interests* (Boston: Beacon Press, 1971). Mannheim's approach was a precursor of this approach, although his was more directed toward social sciences than toward natural sciences. See Karl Mannheim, *Ideology and Utopia* (New York: Harcourt, Brace & World, 1936).

52. See Hannah Pitkin, *Wittgenstein and Justice* (Berkeley: University of California Press, 1972); David Laitin, *Politics, Language, and Thought* (Chicago: University of Chicago Press, 1977); and Benjamin Whorf, *Language, Thought, and Reality* (Cambridge, Mass.: MIT Press, 1956). Pitkin, following Wittgenstein, argues that language is a socially created artifact. Others argue for the strong influence of external reality on language, based on evidence of the correlation between languages with respect to particular perceptual concepts. See Steven Lukes, "Relativism in Its Place," in Hollis and Lukes, *Rationality and Relativism*, pp. 261–305; Michael Cole and Sylvia Scribner, *Culture and Thought* (New York: Wiley, 1974); and Marshal H. Segall, Donald T. Campbell, and Melville J. Herskovits, *The Influence of Culture on Visual Perception* (Indianapolis: Bobbs-Merrill, 1966).

53. See Rouse, *Knowledge and Power*, pp. 3–4. Rouse also notes that "even the simplest concepts, such as 'yellow' or 'ball,' have been said to involve far-reaching theoretic assumptions."

54. See David Dickson, "Limiting Democracy: Technocrats and the Liberal State," *Democracy* 1 (January 1981), pp. 61–79; Frank N. Laird, "Limiting Democracy: Participation, Competence, and Energy Policy," Ph.D. diss., Massachusetts Institute of Technology, Cambridge, 1985; and Richard Evan Sclove, *Technology and Freedom* (Chicago: University of Chicago Press, forthcoming).

55. See Duncan Macrae, Jr., "Technical Communities and Political Choice," *Minerva* 14 (Spring 1976), pp. 169–90; David F. Noble, *America by Design: Science, Technology, and the Rise of Corporate*

These approaches lead us to ask what unspoken societal assumptions experts transmit. Is there a dominant social culture that influences the ideas developed and disseminated by scholars? Potentially, even Karl Popper's argument that theories can be evaluated according to their internal coherence rather than their correspondence to empirical reality must rest upon some social set of conditions which dictates the value of logic-deductive thought and the impossibility of "a" and "not a" being true simultaneously.⁵⁶ That new conditions bring about shifts in our own beliefs would appear to be supported by the fact that what Popper refers to as the "third world" of past lore, the body of works stored in libraries, is continually reinterpreted and evokes different responses in subsequent generations of scholars.

Additional questions remain. First, to what extent are specialists' theoretical edifices socially conditioned? And, second, does this conditioning reflect a systemic bias? That is, can it be found in all technical advice, or is it merely another social factor that must be considered in specific circumstances? If there is a systemic bias, then the analysis of beliefs and perceptions omits some of the other fundamental forces in international politics and focuses on epiphenomena. Specialists will not have a salutary effect on policy coordination, since they only mask deeper-seated economic forces. Yet this argument goes too far.

Few would deny that technical advice reflects some prior social conditioning. I would not go so far as to argue, however, that all technical advice shares the same conditioning, that such conditioning is irrevocable over the medium to long term, or that all disciplines are equally burdened. Although the specialists' claim to privileged knowledge is certainly suspect, it is not irrevocably flawed. If the consensus theory of truth is valid, then the fundamental distortions to collective understanding may over time be reduced or at least be detectable by informed study. It is by no means clear that the same sets of constraints and censors operate in every instance of specialization and interpretation. For instance, although Jürgen Habermas argued that social needs dictate that centralized and instrumental bodies of knowledge are deployed for policy purposes,⁵⁷ the growing application of ecologically informed views is much more integrative and open in its orientation. Moreover, Michel Foucault

Capitalism (Oxford: Oxford University Press, 1977); and Nelkin, "Scientific Knowledge, Public Policy, and Democracy." See also Alvin W. Gouldner, *The Future of Intellectuals and the Rise of the New Class* (New York: Seabury Press, 1979), in which Gouldner argues that the social consequences of conferring steering authority on particular groups remain unclear.

56. See Karl Popper, *Objective Knowledge* (Oxford: Oxford University Press, 1972). See also Imre Lakatos, "Falsification and the Methodology of Scientific Research Programmes," in Imre Lakatos and Alan Musgrave, eds., *Criticism and the Growth of Knowledge* (Cambridge: Cambridge University Press, 1970), pp. 91-196. Lakatos offers a sophisticated extension of this argument, with normative suggestions for how to do scientific research and positive suggestions for how to evaluate truth claims from contending research programs. For an alternative viewpoint, see Paul Feyerabend, *Against Method* (New York: Schocken, 1978).

57. See Habermas, *Knowledge and Human Interests*.

ultimately failed to demonstrate a consistent source of social influences that operated on the development of disciplining beliefs and practices.⁵⁸ To take an example presented in this volume of articles, corporate atmospheric scientists stuck to their scientific beliefs, counter to the immediate economic needs of their company.⁵⁹ That there have been pathological instances of the widespread joining of political norms and scientific means is reflected in Nazi medical science and in Lysenko's evolutionary studies in the Soviet Union. But social pressures in these cases served as a form of control and led to their halt.

Ideas inform policies.

Prevailing ideas may be an important determinant of policy choice and persistence. For instance, under the sway of economic liberalism, open trade policies emerged and remained prevalent in the nineteenth and twentieth centuries despite strong pressures toward protectionism. And in the case of the repeal of the Corn Laws, the popularity of economic liberalism helped overcome or preempt the political resistance of agricultural interest groups.⁶⁰ Pointing to the persistent power of economic orthodoxy, John Maynard Keynes observed that "practical men, who believe themselves to be quite exempt from any intellectual influences, are usually the slave of some defunct economist. Madmen in authority who hear voices in the air are distilling their frenzy from some academic scribbler of years back."⁶¹

John Ruggie offers similar arguments with respect to the power of broader visions of reality, or *epistemes*, that provide the assumptions from which policies follow and shape the pattern of politics over the long run. He also introduces the term "epistemic communities" in keeping with this package of dominant worldviews:

Institutionalization involves not only the institutional grid of the state and the international political order, through which behavior is acted out, but also the *epistemes* through which political relationships are visualized. I have borrowed this term from Michel Foucault, to refer to a dominant way

58. Disciplining beliefs and practices are discussed by Michel Foucault in the following works, for example: *Discipline and Punish: The Birth of the Prison* (New York: Vintage Books, 1979); *The History of Sexuality* (New York: Pantheon Books, 1978); and *The Birth of the Clinic* (New York: Pantheon Books, 1973).

59. Two other examples are noteworthy. Although U.S. Surgeon General C. Everett Koop opposed abortion on personal grounds, he did not succumb to political pressures to publicly oppose it on medical grounds. A Catholic priest trained in carbon dating techniques offered evidence against the claims that the shroud found in Turin was Christ's shroud.

60. See Charles Kindleberger, "The Rise of Free Trade in Western Europe," *Journal of Economic History* 35 (March 1975), pp. 20–55. See also Judith Goldstein, "Ideas, Institutions, and Trade Policy," *International Organization* 42 (Winter 1988), pp. 179–217; Judith Goldstein, "The Impact of Ideas on Trade Policy," *International Organization* 43 (Winter 1989), pp. 31–71; and Odell, *U.S. International Monetary Policy*.

61. John Maynard Keynes, *The General Theory of Employment, Interest and Money* (New York: Harcourt, Brace & World, 1936), p. 383.

of looking at social reality, a set of shared symbols and references, mutual expectations and a mutual predictability of intention. Epistemic communities may be said to consist of interrelated roles which grow up around an *episteme*; they delimit, for their members, *the* proper construction of social reality.⁶²

Our usage of the term "epistemic community" is at a lower level of abstraction than Ruggie's usage. We use the term to refer to a concrete collection of individuals who share the same worldview (or *episteme*) and in particular share the four aspects of it that were outlined earlier. While members of an epistemic community by definition share an *episteme* with each other, they do not necessarily share it with other groups or individuals. In practice, the number of members in the communities we describe is relatively small. It is the political infiltration of an epistemic community into governing institutions which lays the groundwork for a broader acceptance of the community's beliefs and ideas about the proper construction of social reality. The result in turn may be the creation of *the* proper construction of reality with respect to a particular issue-area as well as mutual expectations and a mutual predictability of intention. The intent of the articles in this volume is to analyze this process in numerous concrete cases and discern the extent to which the substantive content of policies was shaped by community views and the extent to which other actors and political forces played a role.

While the notion that ideas inform policies is provocative, it leaves a number of questions unanswered. Are ideas themselves socially conditioned, or do social conditions merely affect which ideas gain acceptance? How are ideas disseminated? Why do some prevail over others? What is the life cycle of ideas? How do they evolve? Even if scholars resort to a natural selection model for the evolution of ideas, as Donald Campbell does,⁶³ then they must identify the mechanisms or agents of selection. A fruitful application of ideas to policy choice, at least over time, requires a greater specification of how ideas emerge and change (or evolve and are selected for). Without compelling answers to the questions that remain in this regard, it is difficult to support the argument that ideas are independent variables and not just intervening variables.

The view presented in this volume is that epistemic communities are channels through which new ideas circulate from societies to governments as well as from country to country. However, an epistemic community cannot be reduced to the ideas it embodies or purveys, since these ideas are transmitted in tandem with a set of causal and principled beliefs and reflect a particular political vision. The ideas would be sterile without carriers, who function more or less as cognitive baggage handlers as well as gatekeepers governing the entry of new ideas into institutions. The influence that an epistemic community has

62. John Gerard Ruggie, "International Responses to Technology," *International Organization* 29 (Summer 1975), pp. 569-70.

63. See Campbell, "Evolutionary Epistemology."

and the ideas that it transmits may well be mutually reinforcing. In the articles presented in this volume, the precise dynamics by which epistemic communities generated new ideas and chose between alternatives in particular cases are presented, and the various social and political conditions bearing on the development and dissemination of their ideas and views are discussed in detail.

Actors' understanding of the world and the formulation of alternative actions are shaped by belief systems, operational codes, and cognitive maps.

While we can draw on epistemological arguments about perceptions of and access to reality, we can also draw on the insights of cognitive psychologists, who stress the conditioning role that prior beliefs and established operating procedures play in determining how individuals will respond to new situations or events and choose a course of action when confronted with uncertainty. Faced with a new situation, we identify and interpret problems within existing frameworks and according to past protocols and then try to manage the problems according to operating procedures that we have applied in analogous cases. Aspects of the situation that cannot be dealt with in established ways are only incompletely perceived and processed, with the result that salient dimensions of a problem or issue at hand are often ignored.⁶⁴

Investigating crises during which decisions affecting survival had to be made quickly by heads of state and high-level advisers, scholars have found that information processing was at best incremental and that decision makers tended to apply simplified images of reality which were highly resistant to modification.⁶⁵ Examining noncrisis cases as well, other analysts have noted that decision makers are not always aware of the possible impact of the signals they send, since they tend to presume that the receivers of these signals have a worldview which mirrors their own.⁶⁶ Similarly, decision makers' understanding of others' behavior is shaped by their own beliefs, motives, and intentions, and this sometimes leads them to misinterpret the signals they receive from others. Even the international context in which problems are to be resolved is not equally transparent to all actors.⁶⁷ Factors such as these can contribute to the breakdown of cooperation.

64. See Janice Gross Stein, "International Negotiation: A Multidisciplinary Perspective," *Negotiation Journal*, July 1988, pp. 221-31; and Deborah Welch Larson, "The Psychology of Reciprocity in International Relations," *Negotiation Journal*, July 1988, pp. 281-301.

65. See Ole Holsti, "Crisis Decision Making," in Philip E. Tetlock et al., eds., *Behavior, Society, and Nuclear War*, vol. 1 (New York: Oxford University Press, 1989), pp. 8-84; Jean Lave, *Cognition in Practice* (Cambridge: Cambridge University Press, 1988); and R. Nisbett and L. Ross, *Human Inference* (Englewood Cliffs, N.J.: Prentice-Hall, 1980). See also Erving Goffman, *Frame Analysis* (Cambridge, Mass.: Harvard University Press, 1974).

66. See Jervis, *Perception and Misperception in International Politics*; and Robert Jervis, "Realism, Game Theory, and Cooperation," *World Politics* 40 (April 1988), pp. 317-49.

67. See Snyder and Diesing, *Conflict Among Nations*.

As Ole Holsti has argued, belief systems impose “cognitive restraints on rationality.”⁶⁸ More broadly, the combination of prior belief systems, operational codes, and cognitive maps shapes decision makers’ responses not only by influencing the ways in which they interpret the world but also by erecting barriers to the types of information that they consider valuable.⁶⁹

Yet policy responses to uncertainty cannot be reduced to cognitive psychology. Belief systems may be conferred by epistemic communities. As argued in an earlier section, whether decision makers turn to epistemic communities for advice depends on the level of their uncertainty about an issue-area. Failed policies, crises, and unanticipated events that call into question their understanding of an issue-area are likely to precipitate searches for new information, as are the increasing complexity and technical nature of problems. If decision makers have no strong preconceived views and beliefs about an issue-area in which regulation is to be undertaken for the first time, an epistemic community can have an even greater impact in shaping their interpretations and actions in this case and in establishing the patterns of behavior that they will follow in subsequent cases regarding the issue-area.

Consensual knowledge may contribute to policy coordination and to more comprehensive policies.

Before states can agree on whether and how to deal collectively with a specific problem, they must reach some consensus about the nature and scope of the problem and also about the manner in which the problem relates to other concerns in the same and additional issue-areas. Ernst B. Haas has argued that “interrelatedness may also become interdependence in the sense that new scientific knowledge will create a consensual basis for the recognition of new cause-effect links which had not been recognized before.”⁷⁰ As the scientific

68. See Ole Holsti, “‘The Operational Code’ as an Approach to the Analysis of Belief Systems,” final report to the National Science Foundation, grant no. SOC75-15368, December 1977, p. 2.

69. See Kenneth Boulding, *The Image* (Ann Arbor: University of Michigan Press, 1956); Kenneth Boulding, *Conflict and Defense* (New York: Harper, 1962), chap. 14; Alexander L. George, “The Causal Nexus Between Cognitive Beliefs and Decision-Making Behavior: The ‘Operational Code’ Belief System,” in Lawrence S. Falkowski, ed., *Psychological Models in International Politics* (Boulder, Colo.: Westview Press, 1979), pp. 95–124; and Robert Axelrod, ed., *Structure of Decision: The Cognitive Maps of Political Elites* (Princeton, N.J.: Princeton University Press, 1976). For discussions about artificial intelligence modeling of thought patterns, see Dwain Mefford, “Analogical Reasoning and the Definition of the Situation: Back to Snyder for Concepts and Forward to Artificial Intelligence for Method,” in Charles F. Hermann, Charles W. Kegley, Jr., and James N. Rosenau, eds., *New Directions in the Study of Foreign Policy* (Boston: Allen & Unwin, 1987); and Jaime Carbonell, *Subjective Understanding: Computer Models of Belief Systems* (Ann Arbor: University of Michigan Press, 1981).

70. See Ernst B. Haas, “Knowledge, Technology, Interdependence,” *International Organization* 29 (Summer 1975), pp. 858–59. See also Ernst B. Haas, “Why Collaborate? Issue-Linkage and International Regimes,” *World Politics* 32 (April 1980), pp. 357–405; and Ernst B. Haas, Mary Pat Williams, and Don Babai, *Scientists and World Order* (Berkeley: University of California Press, 1977).

consensus becomes the collective consensus of decision makers and as the nature of the problem is collectively redefined in broader and more interlinked terms, the need for more comprehensive patterns of policy coordination may also be recognized and pursued. Whether collective behavior becomes more comprehensive rather than merely ad hoc and incremental will in turn depend on the extent to which the scientists' and the decision makers' views coincide and the extent to which the negotiations reflect the pursuit of politically motivated linkages and the struggle for control among states. In general, governments and organizations may be said to learn through the evolution of consensual knowledge.

While the role of consensual knowledge in policy coordination has been the focus of numerous studies, the process by which the views of specialists are accepted and acted upon by decision makers are poorly specified. In particular, studies have not addressed the question of how recalcitrant states can be persuaded to accept new causal understandings that point to policies which are contrary to their conceptions of self-interest. Moreover, given the many examples of different states reacting in different ways to the same consensual evidence provided by specialists,⁷¹ it is unclear how effective consensual knowledge is, as an independent variable, at explaining or predicting state behavior. The organizational structures through which consensual knowledge is diffused may be equally important. As the studies presented in this volume demonstrate, epistemic communities can insinuate their views and influence national governments and international organizations by occupying niches in advisory and regulatory bodies. This suggests that the application of consensual knowledge to policymaking depends on the ability of the groups transmitting this knowledge to gain and exercise bureaucratic power. Moreover, while governments and organizations may learn through the evolution of knowledge, the learning does not necessarily lead to policy coordination. In the case of international commodity arrangements, for example, the consensus emerging from new knowledge was that cooperation would not result in joint gains; hence, the efforts at policy coordination collapsed.⁷² This suggests that whether epistemic influence leads to policy coordination is a function of whether the causal beliefs of epistemic communities demonstrate the need for it.

71. See, for example, B. Gillespie, D. Eva, and R. Johnston, "Carcinogenic Risk Assessment in the United States and Great Britain: The Case of Aldrin/Dieldrin," *Social Studies of Science* 9 (August 1979), pp. 265–301; and George Hoberg, Jr., "Risk, Science and Politics: Alachlor Regulation in Canada and the United States," *Canadian Journal of Political Science* 23 (June 1990), pp. 257–77. For a broader discussion of additional factors influencing regulatory agencies' acceptance of consensual knowledge, see Sheila Jasanoff, *Risk Management and Political Culture* (New York: Russell Sage, 1986).

72. See Robert L. Rothstein, "Consensual Knowledge and International Collaboration," *International Organization* 38 (Autumn 1984), pp. 733–62.

Policy choices are often made by discrete networks of actors.

Numerous scholars have argued that domestic regulation in cases involving complex and highly technical issues is often the result of collusion among interested parties. Decision making, rather than being centralized, occurs within an amorphous set of subgovernments. Whether the parties involved are characterized as interest groups, iron triangles, advocacy coalitions, issue networks, or policy networks,⁷³ the point is the same: small networks of policy specialists congregate to discuss specific issues, set agendas, and formulate policy alternatives outside the formal bureaucratic channels, and they also serve as brokers for admitting new ideas into decision-making circles of bureaucrats and elected officials.⁷⁴ While much of the literature in this regard focuses on policymaking in the United States, similar technocratic subgovernments elsewhere have been discussed.⁷⁵ Unfortunately, however, most of the literature has remained descriptive rather than analytic. It does not identify or explore the common causal beliefs that participants may carry with them, nor does it indicate the degree to which such groups actually influence policy outcomes.

As with the transgovernmental literature discussed below, this literature on domestic networks supports several of the arguments pursued in the epistemic communities approach, among them the argument that a nonsystemic level of analysis is useful for considering decisions made in response to systemic stimuli and the argument that networks of specialists can become strong actors at the national level. Key locations from which members of epistemic communities could gain significant leverage over policy choices include think tanks, regulatory agencies, and the type of governmental policy research bodies that are more common outside the United States. Allied through transnational and

73. See Hugh Hecl, "Issue Networks and the Executive Establishment," in Anthony King, ed., *The New American Political System* (Washington, D.C.: American Enterprise Institute, 1978), pp. 87–124; John W. Kingdon, *Agendas, Alternatives, and Public Policies* (Boston: Little, Brown, 1984); Thomas L. Gais, Mark A. Peterson, and Jack L. Walker, "Interest Groups, Iron Triangles, and Representative Institutions in American National Government," *British Journal of Political Science* 14 (April 1984), pp. 161–85; Jack L. Walker, "The Diffusion of Knowledge, Policy Communities, and Agenda Setting: The Relationship of Knowledge and Power," in John E. Tropman, Milan J. Dluhy, and Roger M. Lind, eds., *New Strategic Perspectives on Social Policy* (New York: Pergamon, 1981), pp. 75–96; Paul A. Sabatier, "Knowledge, Policy-Oriented Learning, and Policy Change," *Knowledge Creation, Diffusion, Utilization* 8 (June 1987), pp. 649–92; and John Mark Hansen, "Creating a New Politics: The Evolution of Agricultural Policy Networks in Congress, 1919–1980," Ph.D. diss., Yale University, New Haven, Conn., 1987.

74. See James L. Sundquist, "Research Brokerage: The Weak Link," in Lawrence E. Lynn, Jr., ed., *Knowledge and Policy: The Uncertain Connection*, vol. 5 (Washington, D.C.: National Academy of Science, 1978), pp. 126–44.

75. See Suleiman, *Bureaucrats and Policy Making*; and Merilee S. Grindle, ed., *Politics and Policy Implementation in the Third World* (Princeton, N.J.: Princeton University Press, 1980).

transgovernmental channels, the specialists could have an impact on international policy coordination.

*Coalitions are built transgovernmentally
and transnationally.*

International relations scholars have also identified and pointed to the significance of transgovernmental and transnational channels through which political alliances are forged and information regarding technical issues is transmitted between government officials, international secretariats, nongovernmental bodies, and nongovernmental actors, including communities of professional scientists.⁷⁶ Many of these scholars have argued that management tasks at the international level have to some extent been usurped by groups of functionally equivalent nonstate actors who act relatively independently of the policies of top leaders of their governments. The members of these groups, when operating in tandem through tacit alliances, can concurrently promote their ideas and specific policy objectives within their own countries and governments.

This approach describes the coordinating role of members of international secretariats and of governmental and nongovernmental bodies and the channels through which they interact, but it is unclear about what outcomes are likely to occur other than the formation of short-term policy coalitions among individuals who occupy similar positions or levels of responsibility and interact on a regular basis. Such channels could be used just as well by higher-level foreign policy officials to extend their own view of state interests. With respect to transgovernmental alliances, for example, the approach does not investigate the origin of the interests of the members involved. Do their interests stem from their common bureaucratic roles within their own governments, or are they based on preexisting beliefs and interests which they brought to their jobs and which are likely to be pursued even after they leave their current posts? In the absence of attention paid to any common causal beliefs and understandings among the members, we may well tend to conclude that such alliances will be

76. See Robert O. Keohane and Joseph S. Nye, eds., *Transnational Relations and World Politics* (Cambridge, Mass.: Harvard University Press, 1971); Robert O. Keohane and Joseph S. Nye, "Transgovernmental Relations and International Organizations," *World Politics* 27 (October 1974), pp. 39–62; Raymond F. Hopkins, "Global Management Networks: The Internationalization of Domestic Bureaucracies," *International Social Science Journal* 30 (June 1978), pp. 31–46; William M. Evan, ed., *Knowledge and Power in a Global Society* (Beverly Hills, Calif.: Sage, 1981); and Peter Willets, ed., *Pressure Groups in the Global System* (New York: St. Martin's Press, 1982). For more recent efforts in a similar vein, see Christer Jönsson, "Integration Theory and International Organization," *International Studies Quarterly* 30 (March 1986), pp. 39–57; Christer Jönsson and Staffan Bolin, "IAEA's Role in the International Politics of Atomic Energy," in Lawrence S. Finkelstein, ed., *Politics in the United Nations System* (Durham, N.C.: Duke University Press, 1988), pp. 303–23; and Michael M. Cernea, "Nongovernmental Organizations and Local Development," World Bank discussion paper no. 40, Washington, D.C., 1988.

short-lived.⁷⁷ Indeed, while those pursuing studies of transgovernmental alliances clearly identified channels of diplomacy and interstate interaction which had been neglected previously, they were unable to demonstrate that activities emanating from these channels had any independent influence on outcomes. Moreover, they found that as issues gained in saliency, they came to assume the characteristics of high politics, with the result that the transgovernmental linkages waned.⁷⁸

As Diana Crane found in her study of transnational scientific groups, however, the shared causal beliefs of the individuals in these groups proved to be more important determinants of outcomes than did the channels through which they operated: "These studies show that it is not necessarily an ISPA [international scientific and professional association] which exerts political influence but the expert committee which may or may not be affiliated with an ISPA. The invisible college which cuts across all the organizations involved, both IGOs [international governmental organizations] and INGOs [international nongovernmental organizations], plays an important role in integrating the fragmented IGO programs."⁷⁹ Crane's findings lend support to our argument that epistemic communities operating through transnationally applied policy networks can prove influential in policy coordination.

Organizations are not always captured.

The recent literature on the "new institutionalism" brings together many of the arguments concerning the process of decision making.⁸⁰ Those pursuing the institutionalist approach emphasize the relative autonomy of political institutions, which may mediate the pressures on decision makers from international structures and domestic forces. Ultimately, they argue, institutional choices are influenced to a greater extent by historically inherited preferences and styles than by external structural factors. This means that the initial identification of interests and decision-making procedures will have a major influence on subsequent policy choices, alternatives deemed possible, and actual state behavior—as was evident, for example, in the choice of the Norwegian oil

77. See Barbara B. Crane, "Policy Coordination by Major Western Powers in Bargaining with the Third World: Debt Relief and the Common Fund," *International Organization* 38 (Summer 1984), p. 426.

78. See, for example, Harold K. Jacobson, "WHO: Medicine, Regionalism, and Managed Politics," in Robert W. Cox and Harold K. Jacobson, eds., *The Anatomy of Influence* (New Haven, Conn.: Yale University Press, 1974), p. 214.

79. Diana Crane, "Alternative Models of ISPAs," p. 39.

80. See the following works by James G. March and Johan P. Olsen: "The New Institutionalism: Organizational Factors in Political Life," *American Political Science Review* 78 (September 1984), pp. 734–49; and *Rediscovering Institutions* (New York: Macmillan, 1989). The actual definition of institutions in this literature appears remarkably fluid. Institutions may be anything from formal organizations to social forces (including capitalism) to culture.

ministry to apply the same safety regulations to offshore oil rigs in the 1970s as it had applied earlier to oil tankers.⁸¹

In a similar vein, studies based on organization theory indicate that institutions do not continually monitor their surroundings and reevaluate prior choices. Indeed, in the absence of crises, there will be little reconsideration of past choices, subject to what Peter Blau terms the elasticity of demand for advice.⁸² Yet when prior understandings lead to unexpected outcomes and uncertainty, organizations will take on the function of information seekers and solicitors of advice. As James Wilson notes in this regard, large institutions are more likely to generate new ideas but are less likely to adopt them than are smaller institutions.⁸³

In conjunction, the bodies of literature on organization theory and the new institutionalism shed light on the circumstances under which groups with new ideas are likely to emerge, offer an explanation for their enduring influence, and point to the conclusion that, once in place, a group will persist until subsequent crises challenge its ability to provide advice.

Methodology and guidance for further research

The epistemic communities approach pursued in this volume is distinct from the approaches reviewed above, although it rigorously integrates and builds on the insights gained from many of them. It distinguishes epistemic communities from other groups that seek to exert influence on decision makers, and it specifies in greater detail both the factors that lead knowledge-based groups to cohere and the mechanisms by which they gain and retain influence in the policymaking process.

The research techniques for demonstrating the impact of epistemic communities on the policymaking process are straightforward but painstaking. With respect to a specific community, they involve identifying community membership, determining the community members' principled and causal beliefs, tracing their activities and demonstrating their influence on decision makers at various points in time, identifying alternative credible outcomes that were foreclosed as a result of their influence, and exploring alternative explanations for the actions of decision makers.⁸⁴ The use of counterfactuals may be helpful in this regard.

81. March and Olsen, *Rediscovering Institutions*.

82. Peter Blau, *Exchange and Power in Social Life* (New York: Wiley, 1967), chap. 7. See also James G. March, "Footnotes to Organizational Change," *Administrative Science Quarterly* 26 (December 1981), pp. 563–77.

83. James Q. Wilson, "Innovation in Organization: Notes Toward a Theory," in James D. Thompson, ed., *Approaches to Organizational Design* (Pittsburgh: University of Pittsburgh Press, 1966), pp. 197–218.

84. See Alexander George, "Case Study and Theory Development: The Method of Structured, Focused Comparison," in Paul Gordon, ed., *Diplomacy: New Approaches in History, Theory, and Policy* (New York: Free Press, 1979), pp. 43–68; and Alexander George and Timothy J. McKeown, "Case Studies and Theories of Organizational Decision Making," in *Advances in Information Processing in Organizations*, vol. 2, 1985, pp. 21–58.

One of the points emphasized in the earlier section about distinguishing an epistemic community from another type of knowledge-based group (a discipline, a profession, a coalition of bureaucrats, and so forth) was that while the members of any knowledge-based group may share criteria of validity and a policy enterprise, members of an epistemic community in addition share principled (normative) and causal beliefs. Individuals in the community may be found among the respected experts whose names recur on delegation lists to intergovernmental meetings or among those responsible for drafting background reports or briefing diplomats. Identifying the beliefs of a community calls for a detailed study of materials such as the early publications of community members, testimonies before legislative bodies, speeches, biographical accounts, and interviews. The process of tracing causal beliefs is obviously easier if members' backgrounds are in disciplines that make copious use of equations and models. Operationally, epistemic community members could be distinguished from nonmembers on the basis of whether the key variables and transformation equations incorporated in their models agree. Their beliefs and spread of networks could then be depicted by causal mapping and network analysis.⁸⁵ The extent to which epistemic beliefs mask social conditioning can be assessed through a judicious use of the secondary literature regarding the intellectual history of the disciplines from which the epistemic community derives its understanding of the world.

A robust study of an epistemic community's influence calls for comparative studies of countries and organizations in which the community has been active and those in which it has not. Moreover, it calls for an analysis of policies and practices pursued by governments and organizations not only in the period during which a community is active but also the periods before and after in order to determine both the emergence and the persistence of influence.

As the studies in this volume demonstrate, epistemic communities have exerted their influence on decision makers in a wide variety of issue-areas. Generally called upon for advice under conditions of uncertainty, they have often proved to be significant actors in shaping patterns of international policy coordination.

85. See Axelrod, *Structure of Decision*.