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Introduction

During the past century, an important contributor to climate change and species extinction has been the collective, if unintentional, activity of human beings (Houghton et al. 1995; NRC 1995). In this respect, previous episodes of global warming, including that which ended the last ice age 11,000 years ago, differ from today's (Turekian 1996, 82). Likewise, previous mass extinctions, such as the one that destroyed most forms of life in the oceans some 225 million years ago, differ from today's massive loss of species (Gould 1977, 134). Today, human actions are important drivers of global environmental change. Given that some of the most pressing global environmental problems have an anthropogenic component, it seems reasonable to assume that what humans *think* about environmental phenomena will shape their *actions* toward them.

But how do people—groups of scientists, diplomats, fishers, or environmental activists—come to embrace certain understandings and not others? The present manuscript focuses on certain *institutional mechanisms* through which humans generate knowledge and accept beliefs about phenomena like the earth's ecosystems. Beliefs influence the ways in which agents form interests and select actions.[1] Of course, better knowledge of what ecosystems are, how they function, and their potential value to humans will by itself not eliminate anthropogenic threats to them (see, e.g., NRC 1995). But better knowledge about these phenomena will help humans to recognize their collective interest in protecting them.

This book illustrates how global and other institutions played an important role in generating knowledge about the marine environment at the Scripps Institute of Oceanography (SIO) and the Inter-American Tropical Tuna Commission (IATTC). In particular, it demonstrates how a specific set of institutional mechanisms—the positional fix, the statutory fix, and

the committee fix—provided the means through which changes in institutions shaped the generation and use of knowledge at the Scripps Institution and the IATTC. These mechanisms are also shown to provide the means through which groups and organizations like the IATTC form beliefs and ground regulatory actions. A close examination of the history of research at SIO and the IATTC reveals the operation of these institutional mechanisms and allows us to distinguish them from the mechanisms posited by neorealist and interest-based theories in international relations.

1.1 Intended Contribution

In recent years, students of environmental governance have focused on how new scientific discoveries catalyze political action. For example, the discovery of the "ozone hole" in 1985 led to effective global regulation under the auspices of the 1987 Montreal Protocol and its subsequent amendments (Haas 1992; Litfin 1994; Benedick 1998). Scientific consensus about anthropogenic pollutants in the Mediterranean Sea, disseminated through an international epistemic community, accounts for the successful conclusion of the Mediterranean Action Plan (Haas 1990). In addition, new knowledge, disseminated by epistemic communities and bolstered by international institutions, stimulated international action to address climate change and acid rain (Social Learning Group 2001). Furthermore, active epistemic communities not only improve cooperation but also tend to improve compliance with international environmental regulations (Haas 1998).

In international relations much less attention has focused on the ways in which institutions, once formed, shape the evolution of knowledge, including scientific knowledge. Simply stated, the existing literature explores how scientific knowledge shapes international cooperation and compliance or the formation and functioning of institutions. But the question should also be turned around. How do global political and economic institutions, or issue-specific treaties like the Convention for the Creation of an Inter-American Tropical Tuna Commission, shape knowledge generation? It is this question that the present study seeks to address. The question is important because new knowledge, such as awareness of previously unknown threats, can reshape people's perceptions of their interests, and their actions.

Institutional mechanisms can be seen as one part of a complex web of social practices that shape the generation and use of scientific knowledge. Complex systems tend to exhibit nonlinear behavior. Incremental changes in some parts may yield sharp, strong effects in the whole (Holland 1995). Viewed in this light, institutions can be seen as "amplifiers" of certain ideas, that is, selecting some and magnifying their effects (Haas and McCabe 2001). Institutional theory cannot provide precise predictions about the content of knowledge yet to be generated. At the same time, it is possible to highlight certain mechanisms through which institutional changes shape the generation of and use of knowledge. This is most important in situations characterized by uncertainty. In such situations, people must commit to a particular belief (although they cannot be sure it is true) before they can recognize what their interests are or what their actions should be.

This book illustrates how groups use a specific set of institutional mechanisms to form beliefs. The mechanisms are the positional fix, the statutory fix, and the committee fix. Through these mechanisms, institutions shape the generation of new knowledge, often over long periods of time. Once formed, accepted beliefs repair uncertainty (at least temporarily), illuminate interests, and point to preferred actions. These mechanisms help us to explain the institutional dimension of knowledge generation and, in particular, how global institutions influenced knowledge production at the Scripps Institution and the IATTC. The mechanisms also allow us to explain the sense in which groups can be said to have beliefs and act in more than a metaphorical sense.

1.2 The Conceptual Domain

The international relations literature embraces Max Weber's (1913) insight: "Not ideas, but material and ideal interests, directly govern men's conduct. Yet very frequently the 'world images' that have been created by ideas have, like switchmen, determined the tracks along which action has been pushed by the dynamics of interest" (280). The question is not whether ideas *or* interests matter: both do. Assuming Weber points in the right direction, numerous questions remain. To take just two: If global political institutions shape the generation and use of new knowledge, how (by what mechanisms) does this happen? When decisions must be

made in a context of uncertainty, can we identify institutional mechanisms that people use to grasp onto particular beliefs, at least temporarily, to decide?

The institutional literature points to a wide variety of mechanisms that may potentially shape the generation and use of knowledge. In this section I outline the broad domain within which the present work is situated.

An Institutional Approach to Knowledge

Institutions are "systems of rules, decision-making procedures, and programs that give rise to social practices, assign roles to participants in these practices, and guide interactions among the occupants of the relevant roles. Unlike organizations, which are material entities that typically figure as actors in social practices, institutions may be thought of as rules of the game that determine the character of these practices" (Young, ed. 1999; Young 1994).

Institutionalism, as defended in the present book, encompasses both the new institutionalism in the social sciences (e.g., Young 1994) and more sociological approaches (e.g., March and Olsen 1998). It draws from, and is consistent with, neoliberal institutionalism (NLI) (see Keohane and Nye 1989; Haas, Keohane, and Levy 1993) to the extent that there is agreement on certain foundational assumptions.[2] It also draws from, and is consistent with, weaker constructivisms, but not with stronger ones.[3] Institutionalism in a wide sense embraces three strands of theory: new institutionalism, NLI, and weak constructivism.[4]

A Brief Typology of Institutional Mechanisms

The institutional literature contains a wide variety of mechanisms that may potentially shape the generation and use of knowledge. By surveying some of these mechanisms, it is possible to outline a broad domain of present and future research on the knowledge-generating function of institutions. The following sections are not a summary of research results but rather a conceptual domain of which subsequent chapters develop one part.

Incentive Mechanisms To many institutionalists, the primary mechanisms of concern are incentives. Societies create property rights, which can be seen as a bundle of rights and responsibilities assigned to a property

holder (North 1981; McCay and Acheson 1987; Ostrom 1990). These rights, in turn, create economic incentives that may encourage (or discourage) certain actions, like the generation of new technologies. For example, in the 1980s the prospect of global regulation of ozone-depleting chemicals (ODCs) reshaped incentives to chemical firms, essentially forcing them to increase investment in substitutes for ODCs (Makhijani and Gurney 1995). Framers of the Kyoto Protocol on climate change attempted to create market-based mechanisms, like tradable permits, to provide firms with incentives to develop lower-emission technologies (Young, ed. 1999; Victor 2001). In these examples, institutions shape knowledge by creating incentives for individuals or for firms.

Collective Action Mechanisms Sometimes the incentive structure is such that individuals do not produce the kinds of knowledge society needs. In general, failures of collective action refer to situations in which incentives to individuals lead to outcomes that are detrimental to society as a whole (Axelrod and Keohane 1986). Failures of collective *epistemic* action refer to situations in which incentives to individuals fail to generate the types of information that members of society collectively require. An important segment of the regimes literature explores how international organizations can remedy failures of collective epistemic action.

In such situations, international regimes can generate the kinds of information necessary to improve cooperation (Keohane 1989; Krasner 1983). International organizations may facilitate communication among stakeholders, raising concern about a particular problem (Haas, Keohane, and Levy 1993). For example, the United Nations Environment Programme has disseminated information about problems like stratospheric ozone depletion, thereby catalyzing international cooperation (Haas 1992; Litfin 1994). Organizations may design rules to improve transparency, or information about how well members are complying with rules (Mitchell 1994; 1998; Chayes and Chayes 1995; Hønneland 2000). They may also amplify the effect of epistemic networks, for instance, by developing procedures for integrating scientific advice into international policymaking (Haas and McCabe 2001; Andresen et al. 2000). In the past decade, a substantial part of the regimes literature has explored mechanisms to remedy failures of collective epistemic action.

Other Mechanisms Quite apart from incentives to individuals, it is possible to identify mechanisms through which institutions shape what people believe. Consider international judicial institutions. In the post–Cold War era, international judiciary bodies have proliferated (Keohane, Moravcsik, and Slaughter 2000). International dispute settlement panels establish rules and procedures through which a panel is to arrive at a decision. The specific rules under which these panels operate tend to vary widely (Keohane, Moravcsik, and Slaughter 2000, 459–468). However, once a panel has reached a decision, its ruling forms a precedent that may shape subsequent beliefs about the matter in question. This may happen formally, through legal precedent, or informally, by shaping public opinion. International judicial institutions may be an important, yet so far unexplored, mechanism shaping the formation of beliefs in international affairs.

Institutions may also generate beliefs about "social facts."[5] A social fact is a phenomenon, like trust or legitimacy, that would not exist in the absence of human society. If humans disappeared, so would the phenomenon. An example of a social fact is the use of paper as money (Searle 1995; Ruggie 1998). For paper to function as money, individuals in society must believe that it does. In addition, individuals must believe that other people will accept paper as money. Institutional rules, for example, that specially printed paper counts as money in a particular context, help to generate a collective belief in society that paper is money. Further, collective acceptance entails a reflexive element. An individual accepts paper as money, in part, because she believes that others in society will accept it ("I believe if you believe"). A second area for research concerns the mechanisms through which institutions create and sustain social facts.

Another type of institutional mechanism is the scientific mechanism. International organizations typically design standard procedures through which groups of scientists or experts reach decisions to advise policymaking. For example, the parties to the Framework Convention on Climate Change designed procedures through which scientists, organized into working groups, could arrive at a set of common beliefs with respect to the science of climate change (Andresen et al. 2000; Social Learning Group 2001). The end result of these standard procedures is one or more beliefs that the group (e.g., Working Group I of the Intergovernmental

Panel on Climate Change) accepts as a whole. A third broad area for future research concerns these standard procedures, or institutional mechanisms, through which groups of scientists accept beliefs.

The mechanisms identified here (and summarized in table 1.1) are ideal types. In the real world, they often appear together, nested one within the other. For example, a fishery regime might design an observer scheme to improve transparency (Mitchell 1998). Nested within the regime may be a dispute settlement panel to adjudicate alleged violations. Real-world institutions are complex, but identifying ideal types points to discrete causal mechanisms and possible directions for new research.

1.3 Specific Mechanisms of Concern

Section 1.2 described different types of institutional mechanisms that could, in principle, shape knowledge generation. The domain is large, and table 1.1 only begins to scratch the surface. In the pages that follow, three mechanisms will be put under a magnifying glass.

In general, the problem is to explain how people, at the group or social scale, generate knowledge and form beliefs. This is important because, in emergency situations, people must form some beliefs about situations in which they find themselves before they can decide what actions are in their interest. Often groups form beliefs routinely, for instance, when central bankers must decide what the rate of inflation is before setting interest rates, or when environmental managers must decide what the air quality is in a particular region before recommending regulation. Groups use institutional mechanisms to generate knowledge and fix beliefs. The term *fix* is used to emphasize that the mechanisms help *to establish common understandings* (at least temporarily), *to repair uncertainty,* and *to direct inquiry* (by fixing its direction).[6] Three mechanisms—the positional fix, the statutory fix, and the committee fix—will be examined in detail.

Before specifying these mechanisms, however, it will be useful to clarify briefly the manner in which the term *knowledge* is used in this book. For the purpose of the present study, *knowledge* refers to beliefs people accept in order to facilitate decision making. *Belief* refers to a statement that one or more people accept as true (Tuomela 2000b). Statements may be in verbal form, for example, disseminated at scientific

Table 1.1
Institutional Mechanisms for Knowledge Generation

Mechanism	Examples
Individual Incentive. This type of mechanism shapes the behavior of individuals and organizations. Individuals consider the incentives (payoffs) when choosing among alternative actions. Higher payoffs tend to encourage particular actions.	Institutions shape incentive structures within which individuals act (North 1981), e.g., rules can be designed to encourage or "force" the generation of new technologies (Benedick 1998; Makhijani and Gurney 1995). Ownership rights may be assigned in different ways (e.g., open access vs. private rights); changes in institutions of ownership shape society's ability to generate new technologies (Lessig 1999).
Collective Action. This type of mechanism develops rules and social practices to remedy "Prisoner's Dilemma" failures of collective action, where the structure of individual incentives creates an outcome that is collectively suboptimal (Axelrod and Keohane 1986). Typically this involves the creation of formal or informal regimes (Krasner, ed. 1983; Ostrom 1990; Young 1994).	Circulate knowledge about problems like stratospheric ozone depletion, or information to improve transparency about how well members are complying with rules (Mitchell 1998; Chayes and Chayes 1995).
Judicial. This type of mechanism typically involves some group or social decision regarding factual and normative disputes. Not primarily reflexive, in the sense that evidence is presented in support of (or against) candidate beliefs.	Group belief or acceptance, when institutionalized (e.g., decisions or rulings of war crimes tribunals or international criminal courts). Issues are typically related to violations of international treaties or laws.
Reflexive. This type of mechanism is concerned with the establishment of social facts such as trust and legitimacy ("I believe if you believe").	Use of specially printed paper as money in specified contexts.
Scientific. This type of mechanism comprises standardized procedures for accepting statements by scientists in aggregate. Statements are judged by standards set by the scientific community, such as conformity to logic or to observed phenomena.	A special kind of collective acceptance: peer review. A special kind of group belief: reports of scientific groups or committees, such as the Report of Working Group I of the Intergovernmental Panel on Climate Change.

meetings, in working papers, annual reports of scientific commissions, or peer-reviewed journals. They may also be in symbolic form, displayed in tables, graphs, charts, and maps. The term *knowledge* as used in this book does *not* refer to "justified true beliefs," the sense in which many philosophers use it.[7] For a more precise specification of *knowledge*, see chapter 2, section 2.3.

In this book, use of the term *knowledge* differs from its use in certain areas of philosophy and science and technology studies. For present purposes, questions related to justification and truth are bracketed. Also bracketed are questions related to the social construction of truth (see, e.g., Shapin 1994, 3–7; Barnes, Bloor, and Henry 1996). Using *knowledge* to refer to accepted belief opens a new path for research connected to the international relations ideas literature (Odell 1982; Haas 1990; 1992).

Given this understanding of knowledge, I turn now to specifying the mechanisms through which groups generate knowledge and fix beliefs. First is the *positional fix*. When using the positional fix, a person uses his or her social role, with attached rights and rules, as a guide when framing research or when selecting beliefs. Two examples illustrate the point. First, consider a scientist who serves on a committee to investigate the causes of a particular cancer. She may refer to the responsibilities attached to her role as committee member when framing her research. Even though she could in principle investigate anything, she tailors her research to generating knowledge consistent with the role and its responsibilities. Second, consider a scientist holding a position as chair of an environmental assessment committee. Although he cannot be 100 percent certain about a particular finding, as chair of the committee and for purposes of committee business he will tend to select beliefs consistent with prior published reports of the group. The positional fix refers to use of role or position to establish a belief (at least temporarily) or to fix the direction of research on the basis of one's role or position. As I show later, it is through the positional fix that the directors of the Scripps Institution and the IATTC influenced the direction of knowledge generated at their organizations. Changes in the role of the Director and associated responsibilities were reflected in the nature of the knowledge generated by the organization.

The second mechanism is the *statutory fix*. A statutory fix involves establishing one or more beliefs (at least temporarily) based on ideas embedded in formal or informal rules. John Ruggie (1983) referred to the economic framework embedded in the General Agreement on Tariffs and

Trade (now the World Trade Organization Agreements), a foundation of the world's open trading system, as "embedded liberalism" (188–189). Goldstein and Keohane (1993, 13) found that when they are embedded in rule systems, ideas shape policy outcomes. Embedded ideas can be used as a guide to research or the acceptance of particular beliefs. For example, a group of scientists could use a number of different models in their research (ecosystems models, maximum sustainable yield models). If their organization's foundational documents embed a particular framework, it will point researchers in one direction rather than another. The framework does not determine the content of research, but it privileges one approach at the expense of others. In the absence of the statute, scientists may well have selected a different framework. When they use ideas embedded in rules to guide research or to select beliefs, scientists and other experts employ a statutory fix.[8] This mechanism played an important role in determining the nature of the knowledge generated at the IATTC (see chapter 6). Changes in the ideas embedded in the treaty rules were reflected in the types of knowledge generated and accepted by the organization.

The third mechanism is the *committee fix*. A group of scientists or other experts may meet regularly as a group or committee in order to reach consensus (at least temporarily) on certain matters of fact. For example, in 1988, the Intergovernmental Panel on Climate Change was created to (among other things) assess available information on climate change (Houghton et al. 1995, foreword). The U.S. Federal Reserve regularly issues reports assessing the state of the U.S. economy. If such a group meets on a regular basis, formally or informally, it typically establishes regularized practices through which it accepts (as a group) some set of statements on some matter of uncertainty or some contested fact or set of facts. These rules and practices constitute the committee fix, through which groups form beliefs. As discussed in chapter 6, this mechanism was employed by the IATTC on a regular basis to establish group belief about the state of fish stocks and bycatch, and to recommend regulatory action.

These mechanisms are further discussed in chapter 2, section 2.2.

1.4 Outline of the Book

Section 1.5 seeks to make explicit certain assumptions that underpin the institutional approach adopted in this book. This is necessary because

some of the assumptions, such as those pertaining to social ontology and social epistemology, differ from standard regime theory. It is also necessary to explain the sense in which institutionalism and poststructuralism are incommensurable (making empirical comparisons unhelpful, if not impossible). Readers primarily interested in the main argument may wish to skip directly to chapter 2.

Chapter 2 introduces political, economic, and epistemic institutions as complex systems. It specifies the mechanisms through which these institutions shape the generation and use of knowledge, and clarifies how the term *knowledge* is used. It then explains the research method: structured, focused case studies.

Chapters 3–5 present a focused case history of the Scripps Institution of Oceanography from about 1900 until about 1970. The case was selected because it allows for variation in global political institutions, such as the emergence of the United States as a world power (and regional hegemon) after 1890 and the emergence of the United States as a global hegemon after World War II. Successive Directors of the Scripps Institution used the role of Director (which overlapped with political roles like member of the National Research Council) to frame and reframe research over time. Agents translated changes in global political institutions into changes in knowledge, using the positional fix (as will be argued, referring to the U.S. role in the world, mediated by committees including the National Research Council). A traditional approach to international relations—neorealism—cannot account for this change.

Chapter 6 provides a structured, focused case history of the IATTC. The IATTC used two mechanisms—the statutory fix and the committee fix—to form beliefs about the status of the stocks. As these beliefs changed, so too did the organization's regulatory actions. As the IATTC became aware of increased anthropogenic threat to marine life (yellowfin and dolphins), its regulatory actions became stricter. Another influential view—the interest group approach—cannot explain these changes in knowledge or action.[9]

1.5 The Institutional Perspective

Exploring the knowledge-generating function of institutions requires charting new conceptual terrain.

To orient the analysis it is useful to start with a distinction between collective action and social practice approaches within the new institutionalism (Young 2001). As the analysis moves to less familiar ground, it is necessary to make certain foundational assumptions explicit. Accordingly, this section positions the book with respect to collective action and social practice approaches, clarifies certain ontological and epistemological assumptions, and locates the analysis within the new institutional tradition, broadly defined.

Foundational Assumptions

Young (2001, 9) divides the new institutionalism into two competing families: collective action and social practice.[10] There are three main differences. First, collective action models assume identities are fixed for purposes of analysis. Social practice models focus more on the social construction of identities, for instance, the ways in which regimes shape the identities of participants. Second, collective action models assume that behavior stems from utilitarian calculations ("logic of consequences"), whereas social practice models emphasize the importance of social norms ("the logic of appropriateness") (March and Olsen 1998). Third, collective action models tend to abstract from contextual details, facilitating formalization. Social practice models emphasize the importance of particular contexts, favoring thicker description and qualitative analysis. While there is considerable variation among specific models within these families, Young argues, institutionalists generally tend to identify themselves with one or the other.[11]

The present work does not fit neatly into either family but incorporates elements of both. First, it is concerned less with identity than with social roles.[12] As institutional artifacts, roles tend to be relatively stable. At the same time, roles are human creations ("socially constructed") and are subject to change over time. Rather than assuming roles are fixed (as collective action models might) or asking how roles are constituted in particular contexts (as social practice models might), the present study investigates the question, What is the effect of changes in social roles on the generation of knowledge? That is, how do social roles mediate the generation of knowledge?

Second, when a person acts as a group member, that is, within a social role, both consequences ("payoffs from actions") and appropriateness

("normative correctness") matter. This assumption appears throughout the case studies. For example, when the founders of the Scripps Institution created the role of Director, both consequences (research results) and appropriateness (scientists *should* conduct research) mattered. The Institution's early benefactors, in turn, were concerned not only with the discovery of new forms of life in the ocean but also with their conviction that the Director *should* generate research for the benefit of society. In short, it is assumed that logics of consequences and appropriateness were built into the Director's role.

Third, context matters. Following Turner (1985) and Tuomela (1995; 2000a), I assume that in some contexts a person will act as an individual, and in other contexts she will act as a group member. Of course, formal models necessarily abstract away from contextual factors and cannot capture context as well as well-written case studies can.[13] Nevertheless, it is possible to capture salient elements of context in formal models and to test them with laboratory-type experiments (see, e.g., Turner 1985; Tuomela 2000a). In short, the present analysis does not fit neatly into either family, collective action or social practice. It incorporates elements of both.

To differentiate the present analysis from other approaches, it is necessary to focus on specific models within these families. The interest group model, equivalent to neoclassical economic analysis applied to politics (Olson 1965; Moravcsik 1997), falls within the collective action approach. So does neorealism (Waltz 1979; Mearsheimer 1994).[14] Poststructuralism, which applies insights from the later Foucault, can be placed within the social practice category (Walker 1993; Litfin 1994). The following sections seek to clarify the differences between institutionalism and these alternative approaches, by exposing certain differences in foundational assumptions.

Assumption 1: Social institutions exist. Social institutions exist and tend to generate distinct kinds of social order. *Social order* refers to patterns or regularities that emerge in human behavior, and which often persist over time (Bull 1977; Holland 1995). In international affairs, where governmental arrangements do not exist, people develop and use institutions to provide a measure of order or governance (Young 1994). Institutions are rules and social practices that account for particular kinds of order.

For example, a community may set limits on who may fish in a certain area, thereby designating certain people as fishers, with rights to fish. Attached to the role of fisher is the responsibility to observe restrictions the community may impose, such as the kinds of gear that can be used or open and closed seasons. In situations in which fishing grounds are in international waters or span national boundaries, an international organization like the Form Fisheries Agency or the Inter-American Tropical Tuna Commission may be required to recommend regulations. Whether or not the particulars are written down, active institutions entail assignment of roles, to which rules and rights are attached. Institutions thereby generate patterns in human behavior.

By contrast, the interest group approach assumes either that social institutions do not exist or that they are essentially fixed over long periods of time. Within a given institutional structure such as private property rights, questions focus on how individuals maximize utility subject to constraints. Individuals respond to (exogenously fixed) incentives when choosing among alternative actions. Agents choose the actions that will generate the highest payoffs (Hayek 1948; Olson 1965; North 1981). To return to the example of fishers, the interest group approach assumes that, in the absence of some form of coercion, individuals will overfish to the point where the stock collapses (Hardin 1968; critique in McCay and Acheson 1987).

As applied to knowledge, the interest group approach assumes agents generate the kinds of information that enables them to maximize utility. Friedrich Hayek, for example, assumed that in competitive markets, individual buyers and sellers generate all the information they need to conclude transactions. In aggregate, across society, individual agents generate the socially optimal amount of information "as if" guided by an invisible hand (Hayek 1948). According to this approach, if agents do not produce a certain kind of information—for example, a catalog of species in a certain marine area—then it was not in their interest to do so.

Poststructural approaches provide a second contrast. Consistent with the later Foucault, poststructural approaches assume that institutions are epiphenomenal to discourse (Dreyfus and Rabinow 1982, 77). In other words, as discourses shift, so will institutional configurations. For example, Litfin (1994) analyzed the construction of discourse associated with the discovery of the "ozone hole," and how a discursive shift

associated with this discovery made the negotiation of the 1987 Montreal Protocol possible.

The chasm separating institutionalism and poststructuralism cuts deeper.[15] Rather than seeking to discover pattern or order (as this book does), poststructuralists tend to emphasize discontinuity, contingency, and process. What institutionalists see as institutions and knowledge are to poststructuralists fluid power/knowledges, mutually embedded knowledge/orders, or discourses. Turning attention away from structures (like institutions), for example, Litfin writes, "Structures, constituted by identities and interests, cannot exist apart from process" (Litfin 1994, 3). To some, the goal of analysis itself is to destablilize existing conceptualizations (Walker 1993, 25).

Because they differ in this core assumption, poststructural approaches are incommensurable with institutionalism. Differences in foundational assumptions (including, but not limited to, "institutions exist") make it impossible to translate observations from one to the other. This does not mean poststructuralist approaches are wrong. But they are sufficiently different to render comparative analysis impossible.[16]

Assumption 2: International structure comprises socially constructed rules and practices, not simply material capabilities. A second assumption is that political order can usefully be understood as an institutional system. Following a path opened by Bull (1977), "hegemon" or "great power" can be seen as a social role that an agent takes on, with certain rights and responsibilities attached. Although preponderant military capabilities are necessary for a state to acquire a role as hegemon, they are not sufficient: the state must accept the role (see section 2.1). Within this approach, *international structure* refers to a complex set of overlapping political, economic, epistemic, and other institutions, in which agents relate to each other through relatively stable sets of roles, rules, norms, and social practices.

Assumption 2 is consistent with the work of some constructivists. For example, Wendt (1992) argues that the international political structure assumed by neorealists is composed of social practices, not material capabilities. At stake is a social rather than a strictly material ontology.

The second assumption is inconsistent with neorealism. Waltz (1979), Mearsheimer (1994), and others in this tradition assume that international

structure is primarily composed of material capabilities, or physical measures of its ability to successfully wage war.[17] These include stockpiles of weapons, economic productivity, population, and relevant natural resources. If a single state dominates, the structure is unipolar; two states, bipolar; and more than two states, multipolar. According to this model, as in imperfect markets where oligopolists or monopolists set prices, great powers determine broad patterns in international politics (see, e.g., Waltz 1979, 91–101).

Finally, although assumption 2 differs from that of neoliberal institutionalism and regime theory, it can be seen as a friendly amendment. While material capabilities matter, international political structure is, at root, institutional. Within a framework of meta-institutions like sovereignty, property rights, and scientific disciplines, more specific regimes are nested. This is broadly consistent with the new institutionalism in the social sciences (Young 1994; Ostrom 1990; McCay and Acheson 1987).

This assumption stands out most clearly in chapters 3–5. That the Scripps Institution's research program was, over time, shaped by political factors is hardly news (Raitt and Moulton 1967; Mukerji 1989). However, the existing literature does not explain very clearly *how* the state shaped the research program. Increased funding is one obvious factor. But an institutional approach enables the analyst to identify specific social mechanisms through which political changes reshaped research practices.

Assumption 3: People can act as individuals or as group members. A person can act in a personal capacity as well as in a social capacity (Tuomela 1995; Turner 1985; Turner et al. 1994). When a person acts "as Chairman," or qua group member, she acts for the group. The same person, in a different context, may act qua an individual (in a personal capacity). When acting as a group member, a person's actions are primarily shaped by her social role. When acting as an individual, the same person's actions are more strongly shaped by self-interest.

Evidence from social psychology suggests that, depending on context, a person will activate either a social or an individual identity (see Turner 1985; Turner et al. 1994; Haslam et al. 1996). In support of this view, Turner (1985) reports evidence from a series of experiments with Prisoner's Dilemma games.[18] When both players perceived themselves to

be part of the same group, their choices were twice as cooperative compared to players that perceived themselves to be members of different groups (Turner 1985, 88). In other words, when acting qua group members, players chose to cooperate twice as often compared to players acting qua individuals.

Assumption 3a: Groups as well as individuals can act. Groups as well as individuals can act. A group can be said to act when one of its operative members, acting qua group member, acts. An operative member is an individual empowered to act for the group (Tuomela 1995). A Prime Minister, for example, is an operative member of a state.

This assumption stands in contrast to methodological individualism, which appears in stronger form in the interest group approach. In its stronger form, methodological individualism assumes that *only* individuals can act (Hayek 1948; Yarbrough and Yarbrough 1990, 242). States are modeled *as if* they were rational individuals, and real-world diplomats are individuals who act to advance the interest of the state.

Assumption 3a underpins discussion throughout chapters 3–5. For example, in chapter 3, the Scripps Institution's research program develops as a holistic enterprise, not merely as the sum of individual lines of work. The Director (in the early days, William E. Ritter) created a role for himself as the person who planned and directed this organized group. It is assumed that the Scripps Institution (as an organization) can conduct research. Ritter, acting qua Director, can act for the group as a whole.

Assumption 3b: Groups as well as individuals can hold beliefs. Groups can hold beliefs. This assumption is adapted from the concept of positional group belief (Tuomela 1995). For the purposes of group action, when acting in group mode, members may accept one or more beliefs. This happens, for example, when a regulatory organization must establish some belief about the state of the environment before recommending new rules. Group beliefs are often expressed as the report of a committee, for instance, the report of Working Group I of the Intergovernmental Panel on Climate Change, or the Organization for Economic Cooperation and Development's report on future trends in members' economies. Assumption 3b reflects a social as opposed to a strictly individual epistemology.

It therefore contrasts sharply with strong methodological individualism as seen in the interest group approach. In its strong form, individualism insists that individuals are the *only* agents that hold beliefs. Self-interest leads individuals to form particular beliefs, for example, about market price.

According to this view, it may appear that individuals in a group have formed a social belief, since individuals may all believe the same thing. However, through the "invisible hand" of competition, self-interest directs each individual, pursuing his own interest, to form his own belief. If we assume—as the interest group approach does—that the world is transparently knowable, it is not surprising that self-interested individuals simultaneously arrive at the same belief (Hayek 1948, 33–56).

This invisible hand explanation underpins the economists' assumption of perfect information in perfectly competitive markets. To strong individualists, social knowledge cannot exist except as an aggregation of the beliefs of individuals. Gaps in knowledge are always reducible to a failure of collective epistemic action, a situation in which individuals, pursuing their self-interest, fail to produce a socially optimal outcome.

Social epistemology is consistent with the assumption of weak individualism. All that is required is recognition that under certain circumstances individuals accept beliefs qua group members. For example, the Catholic Church believes that miracles happen. As a Catholic (qua a member of the Church), John believes that miracles happen. Or: the Communist party of state X believes that capitalist countries will soon perish (though none of its members believes so). As a member of the Communist party of X, John believes that capitalist countries will perish (as an individual, he does not) (Tuomela 1995; 2002). In these examples, beliefs are social in the sense that the organization plays a role in forming them. The group does not add up the beliefs of individual members to arrive at a belief. Nothing in this formulation denies that in some situations group beliefs can be formed by canvassing beliefs of members. The point is that other methods of arriving at social beliefs also exist.

In the case studies, the notion of group belief appears most clearly in chapter 6. I assume that it is possible for the IATTC to express beliefs as an organization. Key observations in chapter 6 are reports from the IATTC's scientific staff, including tables, graphs, and other statements from its Annual Report.

Assumption 4: Causal inquiry is valid in the social sciences. It is possible to frame causal hypotheses about social phenomena and to evaluate them using the methods of scientific inquiry. The interrelationships between institutions and social knowledge appear to be varied and complex, but this complexity itself does not negate the possibility of causal analysis (King, Keohane, and Verba 1994, 10–12, 42–43).

Causal here means that changes in one specifiable phenomenon tend to stimulate changes in another, through mechanisms we can identify. It does not mean that these mechanisms fully determine the content of new knowledge. Its evolution involves pattern and order as well as spontaneity and chance. Nor does it mean that "mechanisms" are immutable facets of human nature or of natural law. The mechanisms of concern have been built by people for the purpose of facilitating reasoned (and principled) social action.

In outlining the research agenda for institutionalism in the social sciences, Oran Young (1994) writes, "Above all, we need to investigate the behavioral mechanisms through which institutions produce their effects. . . . Unless we understand the causal connections involved in these impacts, arguments regarding the significance of institutions as determinants of collective outcomes cannot progress beyond correlational accounts" (8).

Many constructivists, on the other hand, seem to avoid causal analysis (e.g., Litfin 1994, 7). In general, constructivists in international relations have focused on constitutive questions, including the processes through which identity, authority, and meaning are formed (and reformed). However, it is also valid and important to identify causal mechanisms through which institutions shape knowledge.

Assumption 5: A world external to the human mind exists; human agency is required to grasp it as knowledge. Assumption 5 is that there is a world out there, and that that world is at least partially knowable. In other words, phenomena external to the human mind (like fish or dolphins) exist, independent of human beliefs about them. Scientific statements can reflect phenomena in the world, albeit with uncertainty. At the same time, the generation and acceptance of beliefs requires human agency. Furthermore, the processes through which beliefs are taken up to inform action are subject to political contestation (Jasanoff 1997; Social Learning Group 2001).

Table 1.2
Ontological and Epistemological Assumptions

Assumption	Contrast
1. Social structures (e.g., institutions) exist and can be relatively stable over time. Institutions, among other things, shape incentives (e.g., through particular configurations of property rights) (North 1981; Ostrom 1990).	According to the interest group approach (Hayek 1948; Olson 1965), incentive structures are essentially fixed. Questions turn on how individuals maximize utility subject to constraints. According to *strong constructivists* and *postmodernists* (e.g., the later Foucault), discourses are continually remade and reinterpreted, and institutions are continually in flux. Questions turn on the construction of (fluid and contingent) identities, authorities, and discourses, not on the effects of relatively stable institutional configurations.
2. The international political and economic orders are institutional (socially constructed).	*Neorealism* (Waltz 1979; Mearsheimer 1994) assumes that the international political order is primarily composed of material phenomena, e.g., material capabilities to wage war.
3a. Social ontology: groups as well as individuals can act (Tuomela 1995; Turner et al. 1994). Consistent with *weak individualism*.	The *interest group approach* (Olson 1965; Moravcsik 1997) assumes only individuals can act. *Strong methodological individualism* models states and other groups "as if" they were rational individuals: only individuals can act (Yarbrough and Yarbrough 1990).
3b. Social epistemology: groups as well as individuals can hold beliefs. Consistent with *weak individualism*.	According to the *interest group approach,* only individuals can hold beliefs ("a belief is an idea in the mind of an individual"). *Strong methodological individualism* models states and other groups "as if" they were rational individuals: only individuals can accept beliefs.

Table 1.2 (continued)

Assumption	Contrast
4. Causal inquiry is valid as applied to human actions (King, Keohane, and Verba 1994).	*Strong constructivists* favor constitutive questions, emphasizing the constitution of identities, authorities, or meaning.
5. A world external to the human mind exists; human agency is needed to grasp it as knowledge. Phenomena exist independent of human beliefs about them. Scientific statements reflect phenomena with uncertainty. Generation and acceptance of beliefs require human agency.	According to *deep relativists,* science cannot inform the policy process because it is determined by political interests. According to *naive realists,* the authority and integrity of science depend in part on its autonomy from political influence.

Assumption 5 is inconsistent with stronger forms of realism in the philosophy of science. The realist tradition maintains that proper scientific inquiry is objective, divorced from political interests or ends (Popper 1972, 56). In this view, the authority or integrity of scientific research depends in part on its autonomy from political influence (Andresen et al. 2000). When taken to an extreme, this position is known as naive realism (Jasanoff 1997).

Assumption 5 is also inconsistent with radical relativism. Radical relativists maintain that scientific statements cannot inform the policy process because scientific research itself is saturated with political interests. Broadly speaking, socially mediated realism as applied in this book will not please stronger constructivists.[19] It does not assume that beliefs and interests, or knowledge and power, are inseparable, for instance, as power/knowledge.

This assumption informs much of the discussion in chapters 3–5. The cases are not meant to suggest, as a naive realist might, that political or economic influence corrupted what could have been a "pure" research program at the Scripps Institution or the IATTC. Nor are they meant to suggest, as a radical relativist might, that research findings are nothing but discourses that reflect power configurations.

Table 1.2 summarizes these assumptions and the contrasting views of them held by various approaches to international relations.

Institutional Framework

Of central concern to the institutional research agenda is governance. Institutions are sets of rules that give rise to social practices, create roles, and guide interactions among occupants of relevant roles (Young 1999; Young, ed. 1999; March and Olsen 1989, 160). A complex, overlapping set of social institutions provides a measure of governance in international affairs.

Institutions shape social practice as follows. When deciding how to act, a person evaluates the context. Does the context stimulate a person to act qua an individual or qua a group member? (Tuomela 1995; 2000a; Turner 1985). If she acts in group mode, what role is the person expected to fill, and what are the rights (or obligations) associated with this particular role in this particular context? In unfamiliar contexts, people tend to refer to what they know about social institutions (roles, with attached rights and obligations) for guidance. Therefore institutions generate order, or patterns, in social behavior (March and Olsen 1989; 1998; Turner et al. 1994; Turner 1985). Institutions also provide flexibility and guide people in new situations or in uncertain contexts.[20]

The basic contours of the new institutionalism are well known in international relations (see, e.g., Young 1994; Yarbrough and Yarbrough 1990; Keohane 1989) and will not be elaborated here. However, it is necessary to differentiate institutionalism from a standard interest group approach.

In its most extreme form, the interest group approach assumes that institutions do not (or need not) exist. It assumes that patterns in social action that appear to result from conscious human coordination actually result from simultaneous, independent decisions by self-interested individuals. Buyers and sellers generate enough information about market price (and other relevant parameters) to conclude transactions because each is propelled to do so by an "invisible hand" (Hayek 1948, 33–56). In competitive markets, those with inadequate knowledge are eliminated. In less extreme form, the interest group approach constitutes a "thin" institutionalism, studying cooperation among self-interested individuals (Krasner, ed. 1983; Oye 1986; Keohane 1989; Milner 1997). To state this more clearly, the interest group approach assumes an individualist ontology. In stronger form, it assumes a strong methodological individualism, that is, "only individuals can act" or "only individuals can

hold beliefs" (Yarbrough and Yarbrough 1990, 236). By contrast, the present analysis assumes that groups like organizations can act and that they can accept beliefs. This occurs through the agency of individual acting qua group members. At the same time, it is useful and valid to study the actions and beliefs of individuals acting *qua* individuals. Compared to the interest group approach and to traditional regime theory, the present analysis is a more *social* institutionalism.

1.6 Summary

Beliefs matter in international politics. In situations characterized by uncertainty, the beliefs people accept shape their interests and actions. Whereas most of the international relations literature focuses on how ideas affect international cooperation and compliance (Haas 1990; 1992; 1998; Goldstein and Keohane 1993; Litfin 1994), this book turns the causal arrow the other way. It focuses on how institutions shape the generation and use of knowledge.

This chapter provided a rough map of the conceptual terrain by surveying the types of mechanisms through which institutions shape knowledge. It clarified five ontological and epistemological assumptions on which the analysis in this book is based. The assumptions underpinning institutionalism were compared with the interest group approach, neorealism, and poststructuralism. Subsequent chapters compare an institutional approach to potential alternatives: neorealism and the interest group approach. Poststructuralism, which is incommensurable with institutionalism, cannot be evaluated in comparative terms.

Chapter 2 clarifies the sense in which complex political, economic, and epistemic systems can be seen as institutional. It introduces the three institutional mechanisms that are the primary focus of this book: the positional fix, the statutory fix, and the committee fix.